Gas Journal

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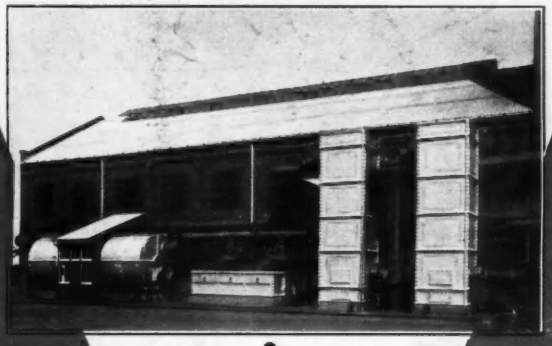

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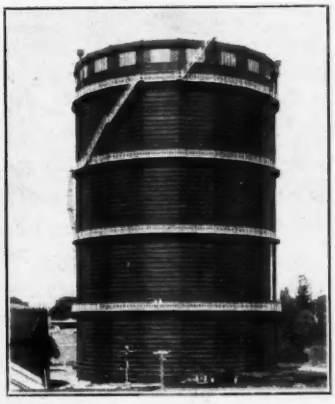

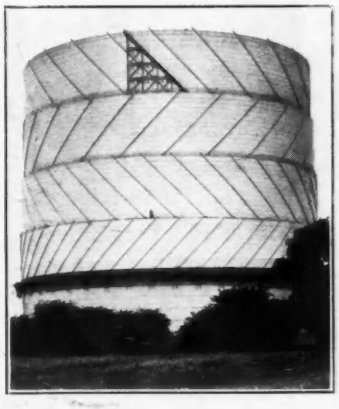

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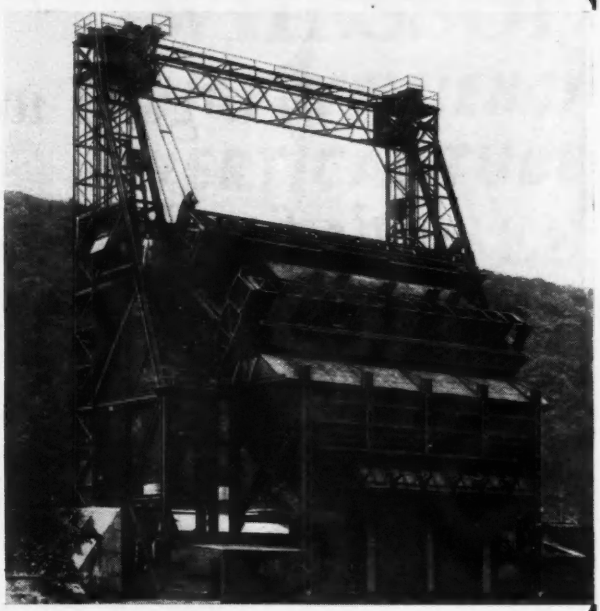

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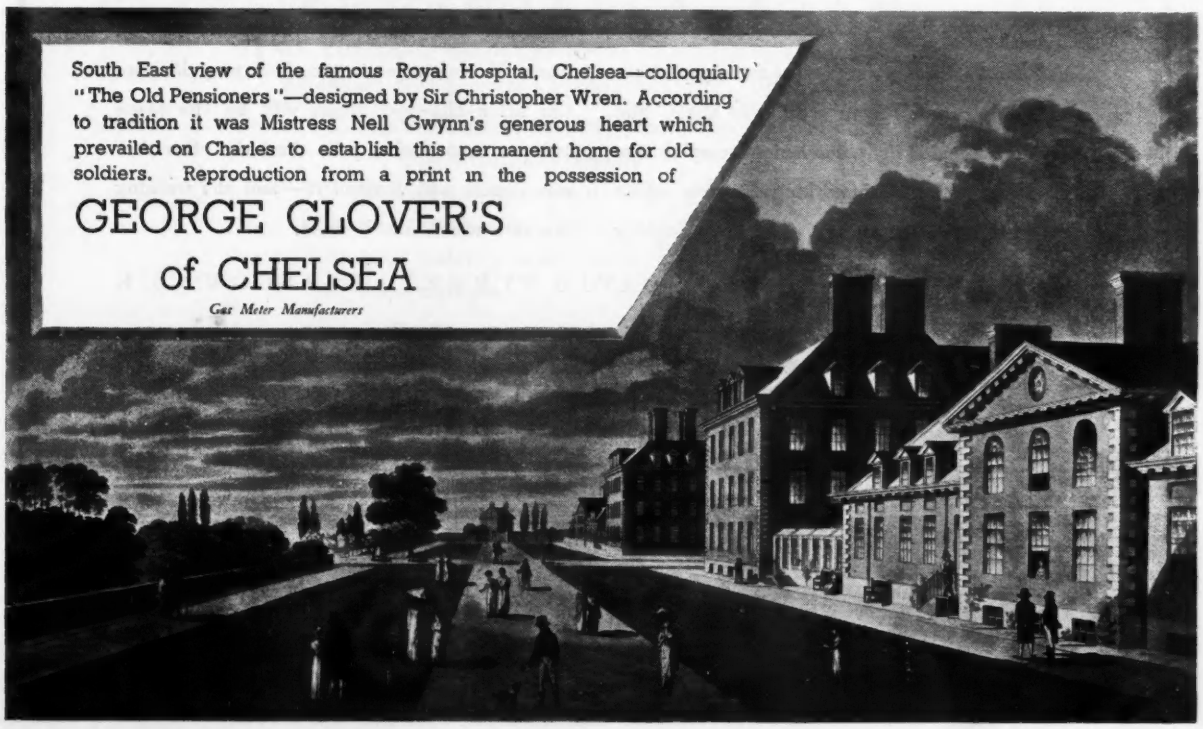
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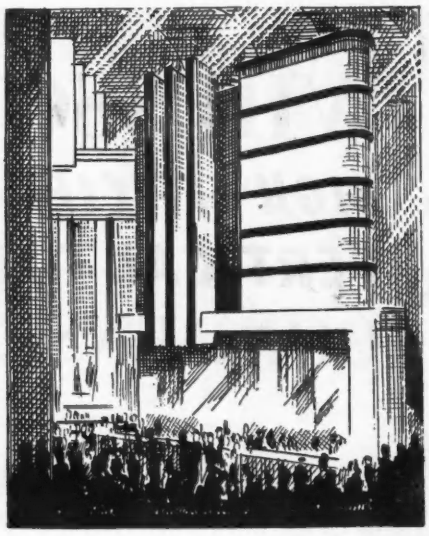

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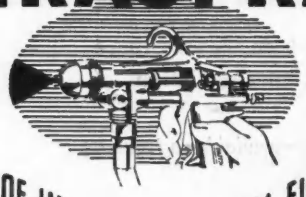

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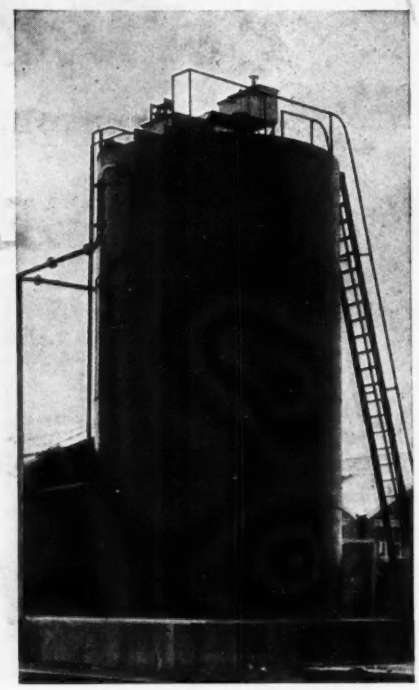

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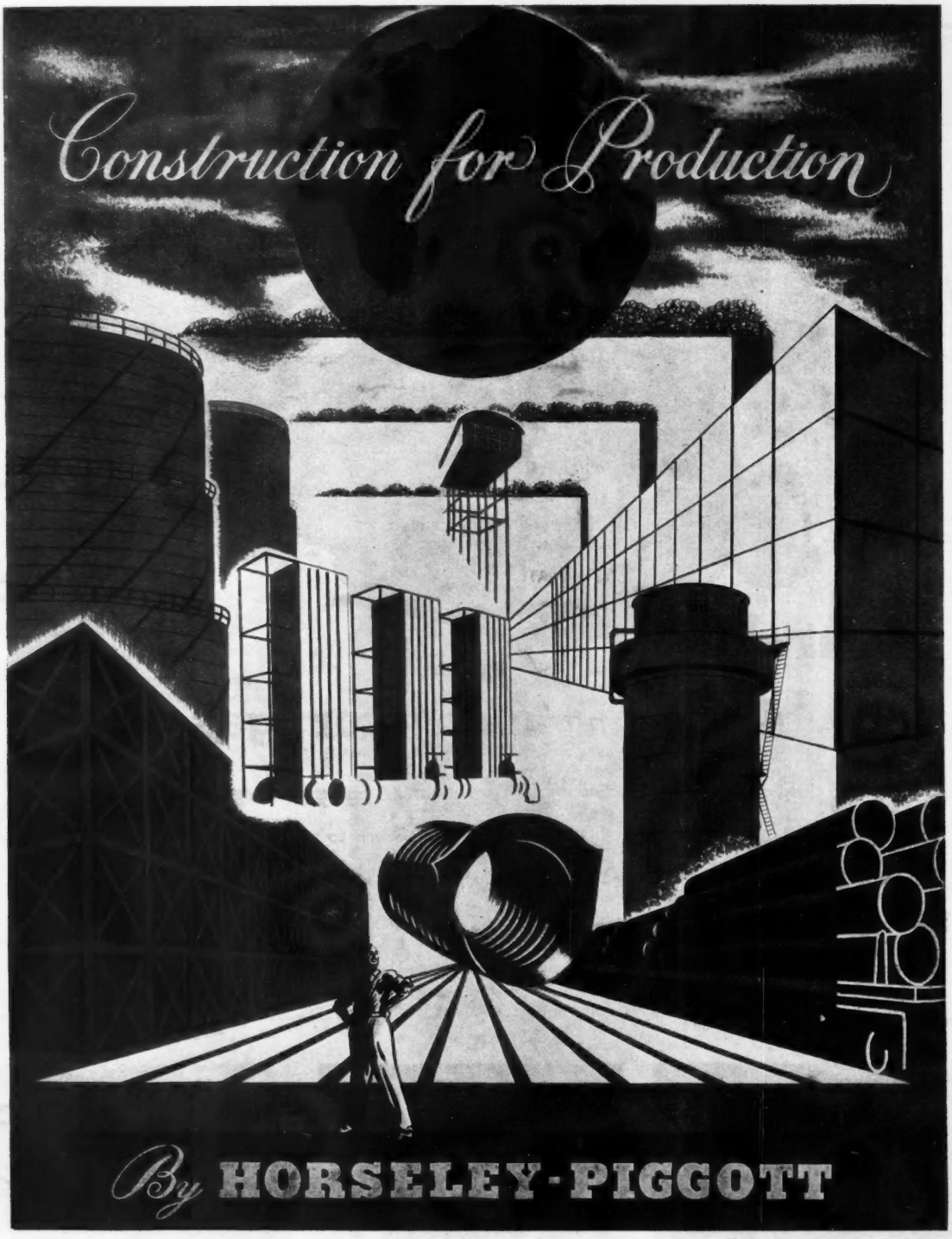

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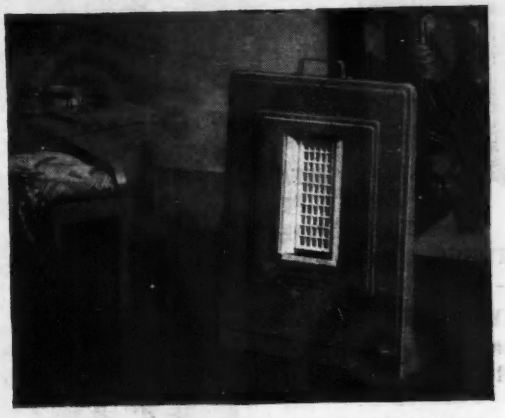

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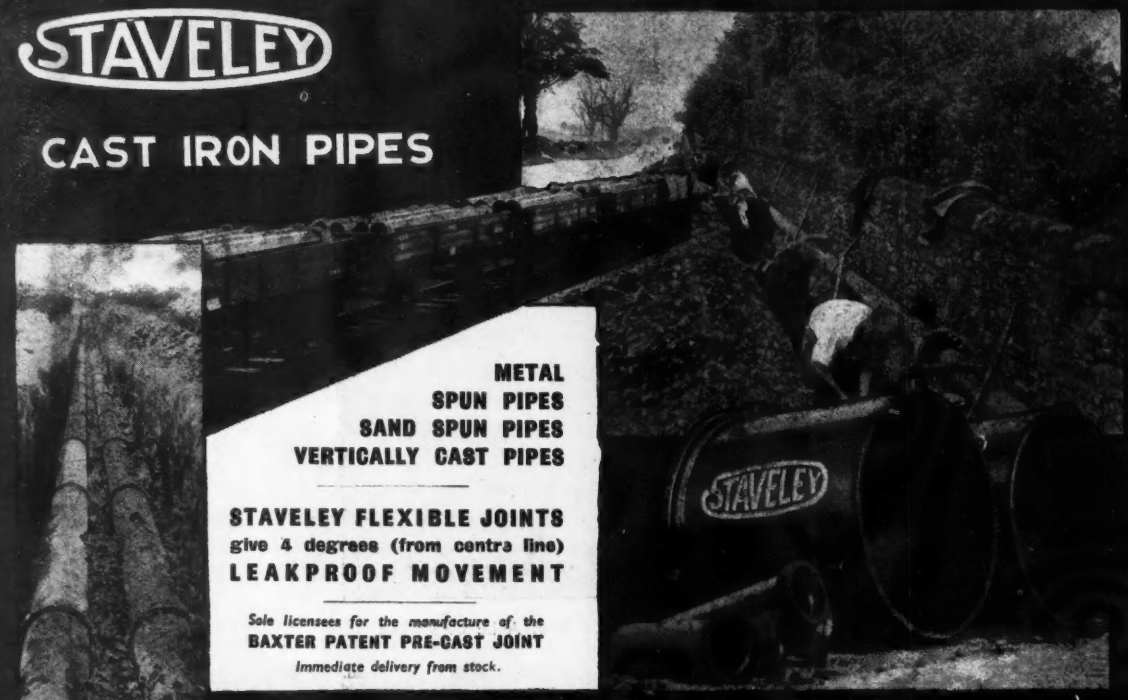

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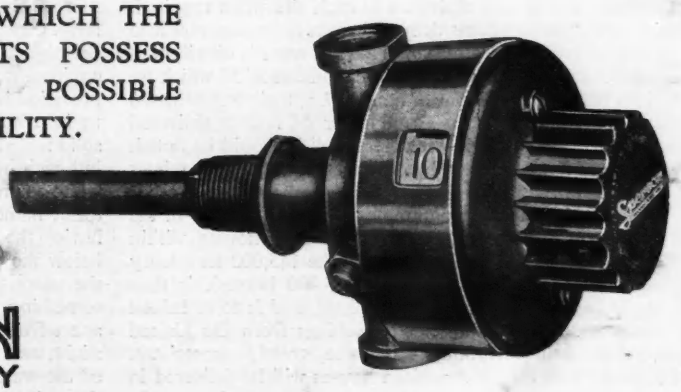

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GAS JOURNAL, MAY 2, 1945

VOL. 245 97th YEAR No. 4276

EDITORIAL NOTES

TEMPORARY HOUSING

AT the invitation of the Ministry of Works we inspected last week the first of the 30,000 American houses to be supplied to Great Britain under lend-lease arrangements. It has been erected at the Housing Research Centre at Garston and will be used to train demonstration teams, who will be put at the disposal of erection contractors to show them the quickest methods of setting up these temporary dwellings. Regular shipments of the American houses are expected to begin this month, each house being shipped in six crates; shipments will be directed to ports feeding the areas in which the house is to be erected. The total of 30,000 is included in the Government's figure of 145,000 temporary dwellings planned for erection as quickly as possible. Prior to our inspection of the American house there was a Press conference at the Ministry of Works, at which the Director of Temporary Housing, Captain F. H. P. Maurice, made a statement on the present situation which enables us to keep our review up to date. When we last wrote on the subject (issue of March 28) three types of temporary dwellings had been approved by the Government—Uniseco, Arcon, and Tarran. To these, four others have now been added—Spooner, Universal, Phoenix, and Aluminium. If we plot a time-type curve of the temporary dwelling programme we find that a lengthy horizontal has merged into a disquieting upward curve.

The temporary housing programme has been under very much discussion for a very long time. A year has passed since we described ("JOURNAL" of May 10, 1944) the Portal "priority" house having as its recipe five tons of steel, half a ton of timber, and unit equipment for the various domestic services—a "priority" house which never went into production, because steel was needed for munitions, and which no longer figures in the variously assorted programme as it stands to-day. Up till April 21 last, and out of the assortment approved, actual production of temporary dwellings from manufacturers was 2,355. This figure relates to the input of the various parts to the "distribution centres," concerning which we were told something last week. These distribution centres have been set up in several parts of the country to receive from the different manufacturers the components which together constitute the house. They have been established to relieve production factories of their "make"—*i.e.*, to relieve them of storage—and to ensure that a complete house is in fact delivered to each site when required. The aim is to "phase" items delivered from manufacturers into the centres as regards localities, and also as regards distribution to sites fed from the centres. Now the figure of 2,355 which we have given relates to the input of houses (*i.e.*, their components) to the distributing centres. The number of houses delivered to site for erection is 1,134—"for erection," it should be noted. The number of houses erected by April 21 was 236. This relates to Great Britain.

The temporary housing programme, which is part only of the total housing programme (300,000 permanent houses within two years after the war in Europe, plus the 145,000 temporary dwellings—present needs being for 1,125,000 homes), is thus only at the beginning of its practical phase, and is to be helped out by these 30,000 prefabricated dwellings from the United States, whose help everybody, of course, greatly appreciates. It is expected that all the American houses will be delivered in this country by the early part of 1946—say 12 months hence. In regard to the 115,000 British-built dwellings which, it is presumed, will be completed by that time if Government intentions are to be interpreted seriously, the Gas Industry has fully co-operated in the plans for heat services and equipment—*i.e.*, the provision of facilities for cooking, heating, hot water, home laundry, and refrigeration. It is obviously interested in the 30,000 American dwellings which have been promised.

We must differentiate sharply between temporary dwellings and permanent dwellings—that is, as regards the constructional materials and methods employed. We have become so accustomed in this country to a high durability factor in practically everything we manufacture that it is perhaps difficult for us to appreciate to the full what is implied by "temporary construction." But we may well ask what is meant by "temporary" as applied to housing. If the structure of a dwelling is such that it deteriorates to the point of destruction by, say, 10 years, it is obvious that those who live in it will have a pretty thin time towards the end of their tenure; and such a state of affairs is surely to be avoided. A scrapping-loss is infinitely to be preferred. We therefore must accept the assurance, for we are not knowledgeable about new building materials, that the structure of the American temporary dwelling, the material of which the walls are made, will serve its functional purpose effectually in the tenth year of occupancy of the house, having regard to normal usage and probable hazard. The walls are timber framed units faced internally and externally. External facing is of half-inch composition wallboard, or fireboard sheathing, or mineral surface fireboard, or asbestos cement sheeting. We mention their construction merely as indication that the American house is hardly conventional. In saying which we would add that none of the temporary dwellings designed in our own country is conventional.

The floor area of the American temporary house is 600 sq.ft., divided into a living room, two bedrooms, bathroom, and kitchen, the latter measuring 85 sq.ft. Very good natural lighting is a feature of the planning. There is one heating source for the dwelling, a solid fuel openable stove which also serves to heat the water. Additional heat for the bedrooms will have to be by plug-in electrical appliances; for topping-up the water supply or for summer use an electrical immersion heater is fitted in the hot water cylinder, and there is a hot water pipe in the airing cupboard, which, by the way, is of thoroughly practical dimensions. The equipment in the kitchen is not planned on the built-in principle which has found favour in British-designed dwellings of the type, and the individual equipment consists of gas cooker and gas wash-boiler. No provision is made for a refrigerator—which fact rather surprised us in a house of American design and of 1945 vintage. The solid fuel stove and the gas wash-boiler are to be supplied by us, but each house is supplied by the United States with a modern white-enamelled pressed-steel gas cooker fitted with automatic (pilot flame) ignition for hot-plate burners (aerated type) and having the broiler—*i.e.*, the American equivalent of our grill—below the oven. It will be interesting to learn the reaction of the users to the American gas cooker, and we hope to say something more about this later. It will be seen, then, that, apart from lighting, provision for the use of electricity is very slight, and that the major heat services—the substantial portion of the water heating, and the cooking and home laundry—will depend respectively on solid fuel and gas.

THE INDUSTRIAL LOAD

FEW plant engineers, furnace builders, or apparatus manufacturers are in a position to offer an installation and maintenance service comparable with any which a gas undertaking should be able to give, and we were glad that this was emphasized in a symposium on the sale of gas in industrial premises arranged recently by the London Juniors. The symposium was one of four Papers dealing with the subject from various angles, and it was Mr. Garrud, of the Gas Light and Coke Company, who again stressed the importance of being prepared to offer the industrial consumer a fuel service thorough in every way, as distinct from a piped gas supply to his premises. The factory owner or engineer must be made to feel that if he is using gas plant he has the service of competent engineers and mechanics locally, ready to help him out of trouble should he encounter it. And this is a question which must be tackled by deed and not just by propaganda. To take interest as far as the meter and leave the outlet to become anybody's business will yield no better return than it deserves. A capable and reliable fitting and maintenance service is as essential to making the most of the industrial load as the supply of a uniform fuel under uniform conditions. The more complete this service, the greater will be the yield from industrial meters. In too many instances good equipment has been found working unsatisfactorily due to faulty installation, and the user is unaware of the reasons for it. It may not be within the bounds of undertakings to carry out all that is involved in the installation of industrial apparatus with direct labour, but, under the supervision of an industrial gas engineer, there is much to be said for subcontracting the work, preferably to local firms; a system of subcontracting of this nature has the advantage of mutual trading.

It was natural that during the symposium reference should be made to the work of the Industrial Development Centres, without which work the Gas Industry would not to-day be handling effectively such a large industrial demand or be so well received in factories. But it was put forward by one of the Authors, Mr. Johnson, of Wandsworth, that each centre should have its specialized fields of development. Not that the initiative of individual centres should be entirely restricted by preventing investigation of problems locally when they cut across the speciality of another centre, but that more care should be taken to avoid unnecessary duplication of research. Again, Mr. Johnson put in a plea for the widening of internal control in the various centres and their equipment for training, with, perhaps, interchange of staff. On another aspect of industrial sales we noted with satisfaction the stress laid by Mr. Randall, of the South Metropolitan Gas Company, on the need for paying attention to the appearance as well as the performance of industrial gas equipment. The design and layout of industrial premises will demand gas appliances in keeping with modern trends. It may be argued that apparatus will not work any more efficiently if a further sum is spent on improving appearance. That is the point of view taken only by those who think that low price is the best means of obtaining business in all circumstances, and to our mind it is a very shortsighted viewpoint. Appearance does count in industrial as well as domestic premises. More and more the industrial consumer is impressed by appearance as well as performance, and we must cater for this growing demand.

Need for Training in Accident Prevention

At a largely attended conference in London last week, organized by the Royal Society for the Prevention of Accidents, estimates of the financial cost and the production losses of industrial accidents were given by Mr. Bevin, Minister of Labour and National Service, and Sir Wilfrid Garrett, Chief Inspector of Factories. Mr. Bevin said that the cost of workmen's compensation, which was £17,500,000 a year, was computed to be only one-fifth of the total loss to the community. When they took into account the hidden costs in the form of loss of production, loss of time of other employees when an accident disturbed the smooth working of the shop, damage to machinery and plant, loss of material and the like, they could see how the estimate could grow to a total cost of something approaching £70,000,000 a year. Training in all directions—the training of accident prevention officers, the training of new entrants into industry—must be emphasized as a preventive of accidents. Much could be done by a safety officer and a works safety committee. Sir Wilfrid Garrett said that every year in this country there were killed in factories about 1,000 workpeople, in mines 800, and on the roads between 6,000 and 7,000, and in addition there was all the loss and suffering of non-fatal accidents.

§§

Personal

Mr. W. J. SAVAGE, A.M.I.Chem.E., retired at the end of March after over 25 years' service in Calcutta with the Oriental Gas Company, Ltd. Before going to Calcutta as Chemist and Works Assistant he was on the technical staff of the Birmingham Gas Department for seven years and Chemist to the Rochester, Chatham, and Gillingham Gas Company for four years. Mr. Savage was appointed Assistant Manager of the Oriental Company in 1930 and General Manager and Engineer in 1935. During the period he was at Calcutta the works were largely remodelled and the distribution system greatly extended; the sales of gas have increased from 280 million cu.ft. to 780 million cu.ft. per annum. Mr. Savage took a great interest in public affairs in Calcutta and was President of the Rotary Club there during 1943–44.

* * *

Mr. W. F. CATON, of the Oxford and District Gas Company, son of Mr. W. E. Caton, who was for many years Managing Director and Chief Engineer of that Company, is shortly to join Messrs. Stringer Brothers, of Albion, West Bromwich, one of the oldest established firms in the iron and steel industry.

Letter to the Editor

An Apology to all Scotsmen where e'er they may be.

DEAR SIR,—You will no doubt recollect that one of our advertisements showed a marching band of Scottish Pipers and was headed "A 100 Pipers an' a' an' a'."

It may perhaps interest those of your readers who are "musically minded" to learn that we have recently received from a correspondent in South Australia a letter drawing our attention to certain inaccuracies in the illustration, these being stated as follows:

> "The artist has shown the drones of the bagpipes of equal length, whereas the drone nearest to the player's head (called the big drone) is considerably longer than the other two. Further, it would be most awkward and nearly impossible to play the pipes with the drones in the position shown; they would slide down the arm in a heap. Actually, the big drone lies well up on the player's shoulder, quite close to his neck, and this position gives stability."

Our correspondent adds that the "picture is one of those things which, as Mr. Punch said, makes Caledonia stern and wild."

Although we may justly claim to be experienced in the art or science of engineering as applied to gas-works and chemical plant, we fear that we cannot make a similar claim with regard to the art of music, neither can we claim any intimate knowledge regarding the instruments used in the performance of that art, and consequently we placed our confidence in what we believed to be the more expert knowledge of our illustrative artist, who has the misfortune to be a Sassenach. That confidence in this instance appears to have been somewhat misplaced, and we have replied to our correspondent accordingly, expressing our apologies for our unwitting share in "making Caledonia stern and wild."

We should also like to take this opportunity of extending our apologies to all those of your readers who hail from North of the Border and who may have been similarly exasperated by our "Pipers" advertisement, which has now been withdrawn from further publication.

R. & J. Dempster, Ltd., Yours faithfully,
Manchester, 10. R. A. MATHER,
April 26, 1945. Joint General Manager.

Institute of Fuel

Mr. F. Walker, Chairman of the Midland Regional Fuel Efficiency Committee, presided at the second annual luncheon of the Midland Section of the Institute of Fuel in Birmingham on April 18. He declared that the days of cheap coal are over. "For some time to come," he said, "industry will have to become accustomed to high prices and inferior quality, which will, to some extent, be reflected in the cost of manufactured products." Scientific research and practical experience would have to be co-ordinated to give more economical use of fuels.

Dr. E. W. Smith, President of the Institute, agreed that prices would be high, but said that there were few industries in which the cost of fuel was more than a small fraction of the ultimate cost of the article. The possibilities of greater efficiency in the use of all types of fuel were sufficient to neutralize at least 25% of the increased cost of fuel. He did not believe that fuels need be of poorer quality than before the war. He said that the quality should be consistent, and then better results could be obtained at lower costs by improved methods of applying fuels.

Midland Juniors

Recognition of services rendered to the Midland Junior Gas Association over a long period was made at the annual meeting of the Association held in Birmingham on April 19, when presentations were made to Mr. Alfred Hill, who has been a member for 35 years and Hon. Secretary for the past 11 years, and to Mr. George W. Smith, who has been Hon. Treasurer for 21 years. Mr. Hill gives up the Secretaryship upon becoming Senior Vice-President, and Mr. Smith retires in view of increasing demands upon his time by business.

The new Hon. Secretary is Mr. H. J. Reynolds (Wolverhampton), and Mr. A. W. Attwood (Coventry) becomes Hon. Treasurer.

The PRESIDENT (Mr. F. J. Bengough) occupied the chair and at the outset welcomed Mr. E. A. Goodland, Assistant Secretary and Manager of the Birmingham Gas Department, and Mr. A. B. Britton (President of the Midland Association of Gas Engineers and Managers). In connexion with the retirement of Mr. A. W. Smith he said he had always taken a great interest in the Juniors, and the Secretary had sent a letter conveying the best wishes of the Association.

The SECRETARY read the letter, which stated that it was desired to "place on record our sincere thanks for all the help and encouragement which this Association has received from you since its foundation in 1905. Some of us recall that you served on its first Committee and assisted in laying that sure foundation which has made the work of those who followed so much easier. We hope that you will have good health and live long to enjoy your well earned rest."

In his reply Mr. Smith said he had always taken a keen, although not latterly an active, interest in the affairs of the Midland Juniors, and he had been very gratified to see the Association's development since its formation 40 years ago. He wished the Association and all its members continued prosperity.

The PRESIDENT announced that the Silver Medal of the Society of British Gas Industries had been awarded to Mr. F. L. Atkin (Birmingham) for his Paper, "Infra-Red Drying; Experiments and Results with Gas-fired Drying Processes using Radiant Heat." This, he said, was the second time that Mr. Atkin had won this particular Medal.

The annual report and accounts were presented, and upon the motion of Mr. H. R. LAWTON (Stourbridge), seconded by Mr. F. HARVEY (Bilston), were adopted.

The PRESIDENT announced the appointment of Mr. S. Brockbank, of Walsall, to be Junior Vice-President.

Mr. BROCKBANK said he would do his best to uphold the traditions of the Association.

A vote of thanks was passed to the retiring members of the Council—Messrs. S. C. Bentley, Oxford, now at Wantage, F. N. Tidball (Cannock), and A. W. Attwood (Coventry). This was proposed by Mr. H. J. REYNOLDS and seconded by Mr. G. E. BURDEN.

Mr. TIDBALL replied.

The PRESIDENT proposed a vote of thanks to the officers, the Hon. Secretary, Hon. Treasurer and Hon. Auditor, and Mr. A. G. CRANMER seconded.

Mr. G. W. SMITH replied.

On the proposition of the PRESIDENT, seconded by Mr. HILL, Mr. H. J. Reynolds was elected Secretary.

Mr. A. W. Attwood was appointed Treasurer on the nomination of the PRESIDENT, seconded by Mr. G. W. SMITH.

Mr. S. B. Johnson (Coventry) was elected Auditor and Messrs. A. G. Cranmer and R. Watkins were elected new members of the Council.

A vote of thanks was passed to the members of the Education Committee—Messrs. E. T. Pickering, W. Macnaughton, F. L. Atkin, and F. A. C. Pykett—who were also re-elected.

Presentations were then made to Mr. Alfred Hill and Mr. George W. Smith.

The PRESIDENT said that most of them knew that the success of any organization depended chiefly on the Secretary, and he did not think any member could fully realize how great their indebtedness was until he had passed through the chair. Mr. Hill would be retiring from business in two years' time; he had always been considered a "Junior," and had become part of their organization. He had been Secretary for 11 years and was now passing from Junior to Senior Vice-President. For himself, said Mr. Bengough, he was particularly pleased to have the privilege of making these presentations. The past year had formed one of the busiest sessions which the Association had experienced, and as President he had been responsible therefore for giving the officers more work than usual.

Recently Mr. Smith had been elected President of Birmingham Municipal Officers' Guild and had also been appointed on the retirement of Mr. R. A. Dry, Chief of the Coke Sales Section of the Birmingham Gas Department, and no doubt many members would contact him as the County Secretary and joint Price Adviser in connexion with the Midland Counties Coke Association. All of them would wish Mr. Smith success in his new office.

Mr. HILL and Mr. SMITH responded.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Scottish Juniors

The Annual Joint Meeting of the Eastern and the Western Districts of the Scottish Junior Gas Association was held at the Heriot-Watt College, Edinburgh, on April 7, when Mr. W. Masterton presided.

The minutes of the previous joint meeting having been read and approved, Mr. Masterton introduced Mr. Arthur Forshaw, Chief Chemist, R. & A. Main, Ltd., and called on him to deliver a Paper entitled "Standards of Performance—A Review of 40 Years of Gas Fire Progress." The Paper, which was illustrated by lantern-slides, will be dealt with subsequently in the "JOURNAL." The Author discussed improvement and research on the gas fire, showing the different types of radiant and flue sizes as affecting efficiency. The slides illustrated the type of fire in use in 1905 and the improvement in design since that date.

Mr. Masterton thanked Mr. Forshaw for his Paper, after which members adjourned for tea, the Western members being the guests of the Eastern Association.

The Scottish Junior Gas Association (Eastern District) visited Messrs. Peebles & Co., Ltd., Tay Works, Bonnington, Edinburgh, on April 21, when they were received by Col. Peebles, Chairman and Managing Director. The whole of the works was inspected, and in the meter-proving department the firm's meter governor, for temporary and permanent housing, and a new patent coin-operated by-pass meter were shown on test. This meter continues to record the consumption of gas by the by-pass when the prepayment valve is closed. The meter does not bind, and reopens fully when the first coin is inserted. The excess gas can be prepaid by reducing the number of cubic feet of gas per coin to cover any period the by-pass is likely to be on alone.

The larger governors, for station, district, and retort house, and safety relief valves, were shown and explained, and the new patent Duplex governor, for high and low pressures, was demonstrated under test. This combination has a double balanced valve in front of and operated by a lever attached to the valve rod of the governor. As the governor opens to give more gas, so the smaller double valve in turn is opened more to maintain the extra gas required. Any pressure reduction can be arranged for,

At the conclusion of the inspection the visitors were entertained at tea. Colonel Peebles addressed the gathering, and Principal J. Cameron Smail, O.B.E., of the Heriot Watt College, Edinburgh, spoke on the value of training and accurately recording impressions gained by observation in an inspection such as they had just enjoyed.

The President of the Association, Mr. W. Masterton, proposed a vote of thanks to Col. Peebles and the firm for their hospitality.

I.G.E. Annual Meeting

The Council of The Institution of Gas Engineers is making provisional arrangements to hold the 82nd Annual General Meeting of the Institution in London this year. It is proposed, circumstances permitting, to have a fuller programme than has been possible since 1939, commencing on the morning of Tuesday, June 12, and extending over two or possibly three days.

Diary

May 3.—Southern Association of Gas Engineers and Managers: Grosvenor House, London, 2.30 p.m. Address by A. E. Sylvester.

May 4.—North of England Gas Managers' Association: Annual Meeting, County Hotel, Newcastle, 2.15 p.m.

May 7.—B.G.C.: Domestic Development Committee, Gas Industry House, 2.30 p.m.

May 8.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 10 a.m.

May 8.—British Gas Council: Gas Industry House, 2 p.m.

May 8.—N.G.C. : Central Executive Board, Gas Industry House, after the meeting of the British Gas Council, approximately 3.30 p.m.

May 9.—National Benzole Association: Annual General Meeting, Wellington House, Buckingham Gate, S.W. 1, at 3.45 p.m.

May 10.—Eastern Counties Gas Engineers' and Managers' Association: Spring Meeting, Grosvenor House, W. 1. Presidential Address of J. Hunter Rioch.

May 12.—Manchester and District Junior Gas Association: Meeting in Liverpool. Paper by F. Bell (Liverpool).

May 14.—Women's Gas Council: Executive Committee, Gas Industry House, 12.45 p.m.

May 23.—B.C.G.A.: Meeting of Members in Scotland: Central Station Hotel, Glasgow, 2.30 p.m.

May 24.—Midland Association of Gas Engineers and Managers: Spring Meeting, Hinckley.

May 25.—North of England Gas Managers' Association (Auxiliary Section): Annual Meeting, Newcastle, 2.15 p.m.

Coal and Coke Prices and Allocation

To repay the debt of £25,750,000 incurred by the Exchequer in financing coal production, the price of coal has been increased by 3s. 6d. a ton, with a similar increase in the price of domestic coke, as from yesterday. In making this announcement last week Major Lloyd George also stated that since coal available for domestic consumption was estimated to be less by some 5% than last year, the basis of the restrictions on domestic supplies would be altered; the maximum quantity which might be obtained without licence from May, 1945, to April, 1946, inclusive, would be 50 cwt. in the North and 34 cwt. in the South, but additional quantities would be made available under licence to those depending entirely on solid fuel or whose needs were above the average. The amount of coke and other boiler fuels available for the 12 months would be two tons for the whole country.

X-Ray Analysis in Industry

The X-Ray Analysis Group of the Institute of Physics held its 1945 Conference in London on Thursday and Friday, April 12 and 13. The meetings were held in the Royal Institution. The Conference was opened by Professor Sir Lawrence Bragg, O.B.E., F.R.S., the Chairman of the Group. The time occupied by the Conference was increased over that in previous years, allowing the Thursday morning to be devoted to a number of short contributions on new and improved methods. In the afternoon there was a symposium on the Equipment of X-Ray Laboratories, at which Papers were read by Dr. R. F. Hanstock, Mr. H. S. Peiser and Dr. W. A. Wooster. Dr. Hanstock, of High Duty Alloys, Ltd., dwelt specially on equipment for determining residual stresses in metals. Mr. Peiser, of Imperial Chemical Industries, described a number of types of X-ray apparatus of wide applicability; and Dr. Wooster, of the Department of Mineralogy and Petrology at Cambridge University, described chiefly the accessory crystallographic equipment that is necessary in addition to the X-ray apparatus. In the evening Professor J. D. Bernal, F.R.S., gave a talk on the Future of X-Ray Analysis. He foresaw great developments in automatic and semi-automatic apparatus to cut down the labour of crystallographic analysis, and that applications of X-ray analysis would overshadow interest in it for its own sake. X-ray diffraction outfits, would become obligatory in all industrial, biological, and chemical laboratories of any size.

April 13 was devoted to a discussion on the application of optical principles to the interpretation of X-ray diffraction photographs.

The Annual General Meeting of the Group was held on the first day of the Conference. Professor Sir Lawrence Bragg was re-elected Chairman, and Mr. F. A. Bannister, of the Minerals Department, British Museum, was elected Honorary Secretary of the Group. The Committee for 1944 was re-elected to serve for 1945.

Mirfield Gas-Works Visited

Nearly 100 members of the Manchester District Association of Gas Engineers visited the Ravensthorpe Works of the Mirfield Gas Company on April 20, when Mr. NORMAN HUDSON, the President of the Association, arranged for them to inspect certain items of the plant. Two of the most interesting were an experimental, but full scale, catalytic sulphur removal plant treating the whole of the gas made at the works and erected by W. C. Holmes & Co., Ltd., of Huddersfield, and the plant for the manufacture and regeneration of the catalyst used.

Members were conducted to the plant in small parties, where its design, method of operation, and automatic controls and recorders were explained in detail by members of the staff of both companies, to the evident interest of the visitors. Afternoon tea was afterwards served, following which Mr. C. H. BAMBER, President-elect, proposed a vote of thanks to the Chairman and Directors of both the Mirfield Gas Company and W. C. Holmes & Co., Ltd., for an interesting and instructive afternoon, and also for their hospitality. He stated that both the Gas Company and Messrs. Holmes were to be congratulated on their pioneer work on the problem of sulphur removal. He went on to visualize the demand for gas of a high degree of purity in future legislation, and looked forward to the day when the experiments would be finally completed and total sulphur removal would be an established fact.

Mr. G. E. CURRIER, Senior Vice-President, seconding, agreed with Mr. Bamber as to the trend of future legislation, and hoped that the collaboration of Mirfield Gas Company and Messrs. Holmes would continue on the lines indicated.

Mr. FREDERICK GREEN, Chairman of the Mirfield Gas Company, replying, said he and his Directors were pleased to have members of the Association to visit them, and he hoped they had learned something which would benefit the Industry.

Mr. D. M. HENSHAW, Chairman and Joint Managing Director of Messrs. Holmes, regarding the stage the work of sulphur removal had reached, stressed the experimental nature of the plant, and the need for further practical experience and collection of data, and he expressed the hope that eventually it would be possible to purify gas from sulphur compounds so that the Industry might sell gas at such a price and of such purity as would put gas in the forefront of the fuel industries.

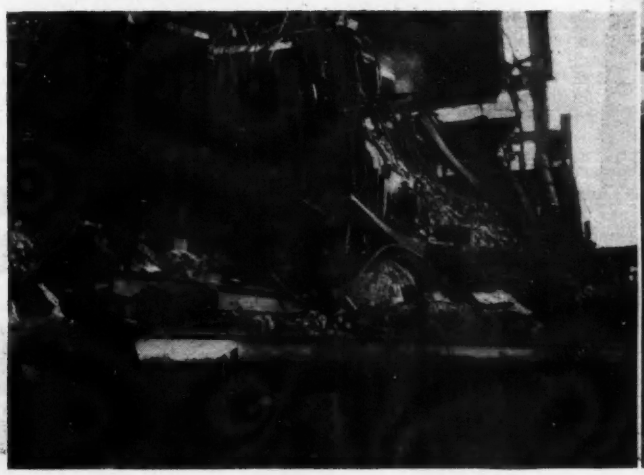
Edinburgh Gas Department will increase the price of gas by 1d. per therm (4½d. per 1,000 cu.ft.) as from June 7 next. Contract rates for hot water heaters will be increased by ½d. per day.

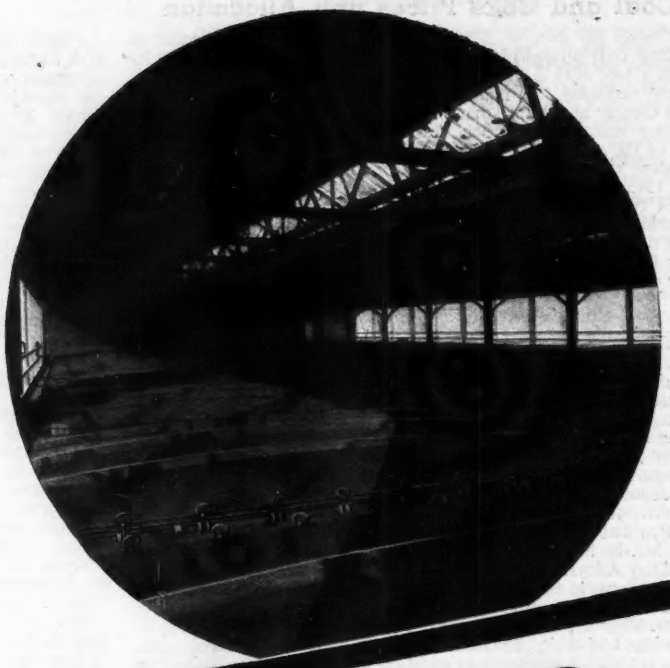
Messrs. Cochran & Co. (Annan) Ltd. ask us to state that the figures relating to the performance of their "Sinuflo" waste heat boiler as shown in their advertisement on Supplement 3 of the "JOURNAL" of April 18 were incorrect and, moreover, were published without the knowledge or sanction of the Sunderland Gas Company.

Rochester Gas-Works in the Blitz

Our photographs show the condition of the retort house at the Rochester Works of the Rochester, Chatham, and Gillingham Gas Company after an enemy air raid in October, 1940. The retort house was put out of action completely, and it was 12 months before repairs could be effected so that it could be placed in production again. In the meantime the whole of the gas required by the Medway towns was carried by the Company's vertical retort plant at Gillingham, supplemented by the water gas plant at Rochester and at Gillingham.

In November, 1940, the Rochester Works was damaged again by H.E., and when repairs from this were nearly completed a land mine caused further damage. In spite of everything the Company's consumers were not allowed to suffer inconvenience.





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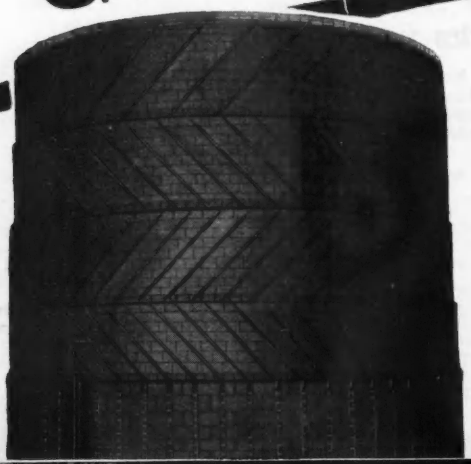
GAS PURIFIERS
GAS HOLDERS



GAS WORKS PLANT

Gas Condensers. Tar Extractors.
Tar and Liquor Separators.
Ammonia Washers-Purifier.
Naphthalene Washers.
Benzole Washing, Extraction and Refinery Plant.
Gas Dehydration Plant.
Tar Treatment and Distillation Plant.
Ammonia Liquor Concentration Plant.
Sulphate of Ammonia Plant.
Gas Heaters and Humidifiers.
Gas Valves—Gas Holders.
High Pressure Gas Holders.
Storage Tanks, Cast Iron and Steel.

NEWTON CHAMBERS

NEWTON CHAMBERS & CO LTD THORNCLIFFE NR SHEFFIELD

Manchester District Association of Gas Engineers

Presidential Address*

of

CECIL H. BAMBER, B.Sc.,

Gas Engineer and Manager, County Borough of Rochdale.

IN presenting this Address may I, at the outset, express my sincere appreciation of the fact that you have selected me for your President this year. It is a distinction which I feel I have yet to justify, and I will make every effort to do so, and to maintain the prestige of our Association and the high standard set by its long run of Presidents.

I should not like to let the opportunity pass of emphasizing and placing on record the very many ways in which our Industry is assisting in the war effort, quite apart from its primary function as a public utility supplying heat and power for home, public service, and essential industry. I will be so bold as to say that no other public utility supplies the raw material for such a variety of highly important products, and I make no apology for referring to this fact, which cannot be too frequently stressed in connexion with the future of our Industry.

It is not my intention in this Address to deal with the subject of post-war planning either as it concerns the Industry as a whole and the major subject of ownership, or individual undertakings and their policies. These problems are the subject of a Committee of Enquiry as you are well aware, and many opinions and policies have been published in the past few years, but I will express the hope that sufficient prominence has been given in the evidence submitted to the importance of the Gas Industry and its by-products to a very large number of other industries. The Gas Industry, together with its sister carbonizing industry the By-Product Coke Works, provides the raw materials for a great number of processes, without which materials these processes either could not be carried on or only worked with great expense and difficulty.

I wish, therefore, in these remarks to direct attention to the scientific and technical side of our Industry, and any references I may make to post-war development will be in connexion with the organization and utilization of the technical resources available to us. The carbonization of coal, or the production of town gas by any other method, is a technical process requiring a high degree of scientific knowledge and skill both in the design and contruction of its manufacturing plant and in the carrying out of the process. Furthermore, the distribution and application of town gas to its many and varied purposes makes use of scientific principles also. This scientific nature of our work is becoming more and more evident every year, and has at no time been so much to the fore as during the present war. It may be of interest to trace this development through the past 120 years, which is approximately the age of our Industry.

In the earliest works, gas was manufactured in its crude state in very simple plant, and a new service for the provision of light was introduced to the public. A public utility was born and was rapidly adopted in all large towns and many smaller ones, in many cases long before such towns had a satisfactory public water supply. The new industry immediately brought in its train a multitude of scientific problems. Some of these were engineering problems dealing with plant design and methods of conveyance of the gas to the consumer. Others were problems of chemistry and physics, dealing with the methods of manufacture and utilization of the gas, and a very important one, that of dealing with the "waste products," as they were at first considered. The coke made was thought to be of little or no value. Compare this with to-day, when one of our major problems is to meet the demand for this commodity. Tar was treated as an objectionable material to be got rid of as conveniently as possible. Gas contained all its original impurities, many of which deposited themselves in the mains, and led again to problems of disposal. The measurement, storage, and governing of gas supplies also arose, and very many other problems.

I would not be so bold as to say that all these problems have been solved. Many of them have, but many remain, and fresh ones arise every day. The manufacture, distribution, and utilization of town gas have become a highly technical and scientific process, which includes an extremely large number of widely varied activities, and produces many products other than the primary one—town gas—which are of great value either for use by themselves or as raw materials for other industries.

The Gas Industry is essentially and primarily a fuel industry, but one which produces other very important substances as well. It has frequently been called a two-fuel industry, and no doubt this has been done to keep in our minds the importance of its second major output—namely, its yield of coke, a useful smokeless solid fuel. I would call it a multi-fuel industry and focus attention on the other fuels it produces, which, while less in quantity, are of extreme importance to our national economy. No gas engineer to-day requires to be reminded of the need for recovering the maximum possible amount of benzole and its allied products toluole and xylole, although in far too many cases it has needed wars to emphasize the fact and to make the recovery of these products financially worth while. Interests in other fuels have definitely been responsible for holding up progress in benzole recovery and the production of other home produced fuels. What will be the position after the war? Will the recovery of benzole cease to a very large extent as it did after the 1914–1918 War, or will the new Ministry of Fuel and Power live up to our expectations of it, and ensure that a national fuel policy is followed that will make the fullest possible use of home produced fuels manufactured in the most efficient fuel processing plant? Benzole recovered from the carbonization of coal is used extensively in the blending of petrol and the production of the finest aviation spirit.

Those gas engineers like myself who distil their own tar, and others to a lesser extent, have had forcibly brought to their notice the importance of tar products as fuels. All the primary products and residues of coal tar distillation have been put under Control Orders. The major proportion of all grades of creosote has been directed either to hydrogenation factories for the production of aviation spirit and other petrols, or to be mixed with pitch to form creosote-pitch mixtures for use in place of imported heavy fuel oil.

The conversion of creosote into high grade petrol by hydrogenation was being carried out for some years before the war, and the hydrogenation of coal tar and even coal itself is a well established process. Production of petrol by hydrogenation of oils was considerably increased on the outbreak of war, and the production of many other hydrocarbons, such as toluene, which is in very great demand to-day, is also carried out by this process.

The development of the use of creosote-pitch mixture for use in oil-fired furnaces is a more recent instance of the employment of a by-product fuel from the Gas Industry. Its importance along with benzole and creosote in conserving all available oil tanker space for the requirements of the Forces is obvious, since industrial users are able to use this product in place of imported petroleum oils. In very many cases industrial furnaces are now being successfully run on this fuel. Fuel Efficiency Bulletin No. 36 tells us that over 800 plants covering a wide field of production have been converted to its use, and that by this means 40% of the total quantity of liquid fuel burnt in industry is being supplied. A considerable amount of research has been carried out in connexion with the preparation of this fuel both by some gas undertakings and by the tar distilling industry. Creosote-pitch mixture can no longer be looked upon in the light of a substitute for heavy petroleum fuel oil, but is a perfectly satisfactory fuel possessing certain advantages over its predecessor. It is rather an alternative fuel with a more emissive flame, and capable in some cases of giving an improved thermal efficiency. Gas Engineers should take every opportunity of recommending its use, and can do so to-day knowing that it is a reliable fuel made to a guaranteed specification. It should not be necessary for me to remind engineers of the importance of this market for our tar products both now and after the war.

In dealing with these fuels derived from coal tar, I must not omit coal tar pitch, which is rapidly becoming an alternative fuel, replacing, when used in solid form, coal chiefly for steam raising, and when used in liquid form replacing heavy petroleum oil. I think the use of pitch as a fuel was prompted largely by the discontinuance of its use as a binder for road making and a consequent slump in markets. Research into its use as a fuel has been carried out, and one of the chief pioneers in this work was the firm of Lancashire Tar Distillers Ltd. To-day, with coal in short supply, the demand for pitch as a fuel is, I think, much greater than for any other purpose. I myself sell all the pitch produced at our works as fuel. It should be borne in mind that pitch for fuel purposes must be manufactured to a closer specification than was formerly the case. Closer technical control of tar distillation is becoming more and more important in just the same way as in all our processes. Pitch is now available in some areas for delivery to consumers in liquid form transported in lagged tanks. Some users of pitch in liquid form have to carry out the melting of the solid pitch. Pitch for use in this way must be free from small pitch, say, below ½-in., from adventitious mineral matter, and be low in ash. These cause trouble in the melting. Solid pitch is usually burned in pulverized form, and for this purpose a very hard pitch is necessary.

These rather sketchy notes and description of the lesser known fuels produced from our by-products should suffice to emphasize the importance of our Industry as a multi-fuel industry. My description of tar products has so far been confined to their use as fuels, and to those uses as fuels which should be, I believe, permanent ones in both wartime and peacetime. I have not devoted any time to the use of creosote in diesel engines, both stationary and mobile. In Rochdale we were one of the pioneers of the use of refined creosote oil in passenger transport vehicles, and all through the war we have been using this fuel to augment our permitted mileage, at first rather frowned upon by the Ministry of War Transport, but later grudgingly approved. I feel that this use of creosote is only a temporary one, for, in common with the use of producer gas for vehicle propulsion, the engine for maximum efficiency and effectiveness needs to be specially designed with a higher compression ratio. We have also successfully run petrol engines on creosote, but the adaptation is not simple, and hardly merits, in its present stage of development, further attention, as it is only a poor substitute for petrol.

* Presented at a Meeting in Manchester, April 27, 1945.

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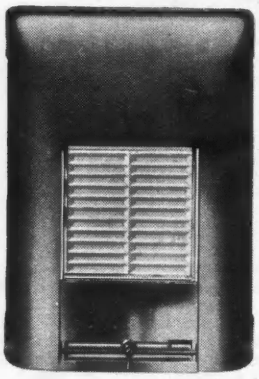

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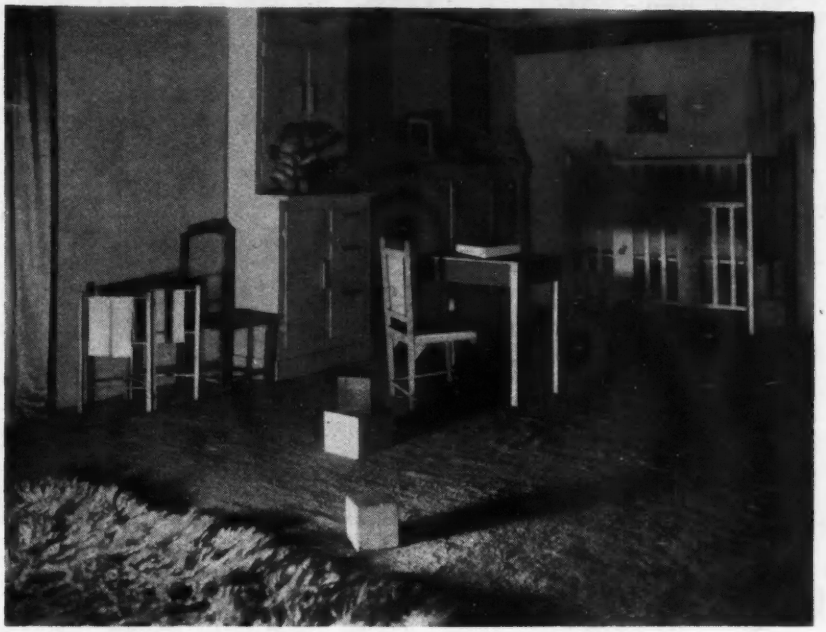

¶ (*Upper illustration*) Direct photograph of a children's nursery set-up in the path of the radiation emitted by a Standard High Beam Gas fire running at normal adjustment and gas rate (15,750 B.Th.U./hr.)

(*Lower illustration*) Direct photograph taken under exactly the same conditions, but the gas fire used in this case was a standard model Silent Beam, also running at normal gas rate (15,000 B.Th.U./hr.)

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The Gas Industry being the main source of these alternative fuels is contributing in no uncertain manner to the conservation of the country's fuel reserves, and has very materially helped in the Battle of the Atlantic and the defeat of the U boats by rendering unnecessary the importing of a very large proportion of the nation's requirements of fuel oil and petrol. Our enemies have always recognized the importance of home produced fuels both in war and peace. Before the war they undoubtedly led the world in the home production of liquid fuels. It is not possible now to compare their production with our own, but naturally we have both increased home production enormously. The R.A.F. and the Allied Commands have always had as very important targets liquid fuel producing factories in Germany, and the frequency with which synthetic oil plants, benzole plants, gas and coke works are attacked indicates this.

Before leaving the subject of tar and its products, I must refer to those many distillation products and derivatives of importance to industry generally as raw materials. It is difficult for me at this stage to refrain from writing a long treatise on coal tar products, and I must bear in mind that my listeners to this Address are as well aware of the facts as I am myself. Furthermore, our technical works give us all the detail we require, while the British Commercial Gas Association has issued several booklets and at least one film on this subject. But this Address will, I hope, be printed in the Technical Press, and I must repeat my previous statement and say that my object is to secure publicity for a very important side of our Industry.

There have been very great discoveries made in the preparation of new explosives during this war, but I think I am correct in stating that tri-nitro-toluene is still the explosive most extensively used by both sides, and the toluene derived as a gas-works and coke works by-product is one of the most important sources of the raw material. Xylenes and solvent naphthas are widely used substances. The phenols and cresols from tar acids, while still valuable for their original and better known uses, now have exceedingly great importance as the starting material of a whole range of synthetic resins, those wonderful materials which have a great variety of uses at present, and which in peace time will have even more extensive uses when scientific research can be devoted to happier problems. There are two main classes of synthetic resins or plastics as they are now known in industry. One class starts from urea and the other from phenols. While the first class cannot be strictly considered as a Gas Industry product, water gas is used in the manufacture of synthetic urea, and the manufacture of water gas was developed primarily for town gas supply. This first class of plastics generally includes the transparent and lighter coloured ones, while the second class using phenols, cresols, &c., generally includes the darker and opaque products. Each class has very numerous uses in a great many industries, and particularly in the electrical industry. It is expected that the use of plastics will increase very greatly after the war, and the importance of this comparatively young industry to the future markets for coal tar products is evident to us all. During the war strict control of tar acids has been exercised in order to supply the necessary raw materials for the manufacture of plastics for war supplies, and even the creosote used for hydrogenation purposes has first had to be washed for removal of phenols and tar acids.

While dealing with the subject of plastics I was interested to find in the Address of Mr. Brendan Bracken, Minister of Information, to the Royal Empire Society on Feb. 21 last that he had chosen the plastics industry to illustrate his statement that there was no reason for pessimism in regard to the future of British industry. Basic industries must change and new ones be developed. So it had been in the past, and would be in the future. A new industrial revolution is with us, and this country must be sufficiently energetic and enterprising to derive as many benefits from this new industrial revolution as it did from the first. The newer industries, he said, owed much to scientists and chemists, and were making rapid progress before the war. He quoted the plastics industry, which he said now employs 100,000 workers, and uses each year about four million tons of raw materials from the coal and gas industries alone. It was an industry, he said, which may alter the future of many other industries, and become a vast earner of revenue.

I personally would express the hope that the Gas Industry is fully alive to facts of this nature, and also that it is willing and prepared for changes in its basic character which, if properly made, will render its future a very prosperous one. We must experiment with new processes, be enterprising, and prepared to take risks.

Returning again to the subject of by-products, the war of 1914–1918 emphasized the need for the home production of dyestuffs, and as a result the manufacture of dyestuffs using coal-tar products became a great industry in this country. The present war has again directed attention to this subject, as evidenced by the Control of many products, such as naphthalene and anthracene. Dyestuffs from coal tar are also of great importance in photography for colour sensitizing and colour photography, while photographic developers are nearly all derivatives of coal tar, as are also a very large number of drugs, antiseptics, disinfectants, and artificial perfumes. What a contribution our Industry makes through its production of coal tar to the chemical industry in the way of raw materials which are generally only obtainable in small quantities from other sources! Further to assist and supply the heavy chemical industry, our works produce ammonia and sulphur, the latter either elementary or in the form of spent oxide, which contains a high percentage of sulphur with a relatively low arsenic content. I have said much about the value of our by-product coal tar to other industries, and cannot refrain here from asking the question, "What is its value to us in the Gas Industry? In view of its increasing importance in the chemical and fuel industries, does the gas-works receive a commensurate revenue from tar?" I think not, and we must press this point home to industries using our tar products, and to the Government Controls who have so much to do with the regulation of prices for tar and other by-products. Let the Gas Industry insist on greater revenue from tar, and incidentally this will help to keep the price of gas at a lower level.

I think I have said enough so far in these short notes to remind ourselves and to focus attention firstly on the number and importance of the products of the Gas Industry, and secondly on the technical character of its work. For this reason it should be obvious to anyone that the gas engineer and his staff should be persons possessing a high degree of technical skill and having a wide scientific knowledge.

A gas engineer must, in addition to his training as a mechanical and constructional engineer, have been trained in chemical engineering. In fact, I would go so far myself as to say that this should be the main portion of his training. Generally if he is in charge of a works he will supervise gas manufacture and distribution for most of his time, while the problems of design, reconstruction, and extension of plant will only be of periodic occurrence. His problems of manufacture are always with him, and the subject of normal plant maintenance is one he will study in his chemical engineering training. To take charge of gas manufacture it is essential for a man to have a considerable knowledge of chemistry and physics if he is to get the best results from a plant which is operating in accordance with well established chemical and physical laws. It should be borne in mind here that in the general term gas engineer I am referring only to the scientific side of the duties expected of such an official, and not the managerial and commercial duties which he often has to perform, while I include also his technical staff, most of whom are men whose ultimate aim is to qualify as gas engineers, if they are not already so qualified. I propose at this stage to devote a little time and space to the problems of manufacture in the Gas Industry in order to indicate their variety and technical nature and the advisability of having at any works sufficient staff of the required ability to deal with them.

It is fitting at this stage to consider our raw material—coal. This can also be considered to be the raw material for all the nation's industries, although not in the strict sense that it is ours. Dr. E. V. Evans in his Presidential Address to The Institution of Gas Engineers, dealing with the importance of coal to this country, made this statement: "The fertility of the land, the underground deposits of coal, and the skill of the people are our only assets." I am certain that the processing of raw coal at the gas-works or by-product coke works is the only rational means of conserving to the utmost this chief natural resource of our country. This belief is shared not only by my fellow gas engineers, and our corresponding officials in the coke oven industry, but also by many eminent scientists and disinterested observers. The skill of our people can be increased by suitable training schemes, and the skilled technicians so produced will, we hope, assist in the wise use and conservation of our coal reserves. The importance of this subject has been more in the public eye of recent years than ever, particularly as it appears to be becoming increasingly difficult to secure adequate supplies of suitable coal.

In the past gas engineers have had the privilege of selecting the coals which they prefer or decide are best for their purpose. This is not so to-day, and may not be for many years to come. In fact some of the less optimistic of us fear that we may never again be able to specify and be sure of receiving any particular coal. This would be almost a disaster to our Industry, and the strongest representation possible must be made in the right quarters to secure recognition of this principle as soon as possible after the present emergency. At present the position we have to face is that the Mines Department seems to consider that any form of coal will suit gas manufacture. Undoubtedly while we must feel by experiences during the last few years that the coal problem might have been dealt with both more expeditiously and in a more satisfactory manner, we must appreciate its magnitude, and as technicians make every effort possible to secure the best results and the required output from what are very definitely unsuitable and inferior fuels. Here the services of well-trained technical staffs become more and more necessary. It is very necessary that carbonization and gas manufacture generally shall be under strict technical control. Many good foremen brought up throughout their working careers on gas-works still exist, but their scientific knowledge is small and insufficient to cope with the modern process of gas manufacture. These men still have their function as controllers of the labour employed, and no technician would wish to interfere with it, but plant control must be handed over to the laboratory staff. It is necessary to regulate the process of gas manufacture to produce by the best methods known to us the maximum proportion of the therms contained in the coal as gas, coke, and other solid and liquid products of value as fuels or as raw materials for other processes. Furthermore, our Industry must apply itself keenly to research, and further improve the yields of wanted materials from the coal. By so doing we shall be contributing in a most important way to the economic use of the nation's fuel reserves. To exercise this control and to carry out gas-works processes in true scientific manner, adequate technical staffs are necessary.

I have earlier expressed the hope that our Industry is willing and prepared for changes in its basic character, and here I would say that I have in mind not only the changes in policy which have become the

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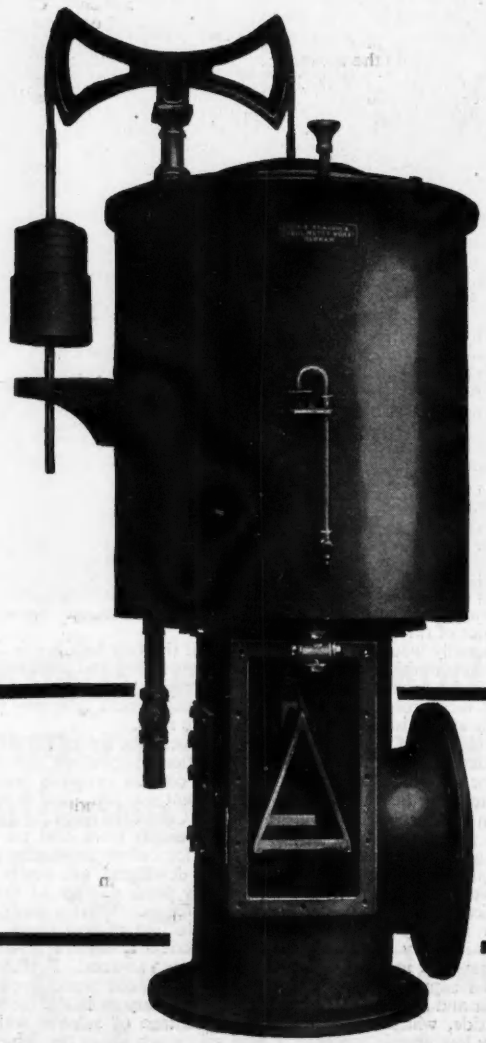

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subjects of general discussion and controversy both inside and outside our own circles, under the title of "Post-War Planning," but also changes in the methods of running our works, in the type and quality of products, and in the resultant and necessary changes of personnel required for the new methods and products. Much has been said by well known engineers in many branches of industry and by statesmen during the past year or so on this subject of change in methods and the personnel in industry. One very real accusation made against those engaged in production is that in this country we suffer from a tendency to confuse a proper respect and admiration for the technical achievements of our predecessors with unnecessary admiration and loyalty to their manufacturing methods and technique. This is no way to make progress, and is in fact dangerous; yet it is only too true in the case of many industries, not excepting our own.

How many gas engineers seeking authority to appoint an additional technical man have been told that his predecessor had not even an assistant engineer, let alone draughtsmen and chemists, and that good results and profits were then achieved. The persons responsible for the undertakings were either ignorant of, or refused to appreciate the changes in, gas-works technique which have inevitably taken place. Our predecessors, I state with all respect, had not our problems to face. Coal was cheap and reliable in quality and supply. In fact they were able to choose their coal from collieries only too anxious to meet their needs. The plant they used for carbonization worked at relatively low temperatures, and was not critical in regard either to the type of coal used or to the treatment (within reasonable limits) which it received. It was quite safe for any intelligent foreman to control the heating of retorts and carbonization generally. The Acts controlling Gas Supply were in the most part less exacting than those now in force. Coke was readily saleable even in its unscreened state. To-day, leaving out of consideration the exceptional conditions arising out of the war, coke sales have to be carefully nursed, and a higher and higher standard of quality has been reached despite the disadvantage of lack of choice of coals. The standard of purity of by-products was very much lower. Only during the past 20 years or so has it become really necessary to produce neutral sulphate of ammonia with a guaranteed minimum ammonia content. Concentrated ammonia liquor was not as a rule manufactured on the average gas-works, while the problem of disposal of gas-works effluent was almost unknown until the activated sludge method of sewage treatment was introduced. Tar and tar products did not demand a very high standard of quality, and tar and pitch were supreme and unquestioned for road making. Electrostatic methods for tar and dust removal were not in use. Very few gas-works recovered benzole, and the drying of coal gas was not practised. Purification by lime, while it had its problems, was not such a complex process as oxide purification. The industrial use of town gas was only in its infancy. I think I have said enough to justify the inclusion in our staffs to-day of an adequate number of technically trained men and women.

It must not be assumed by these statements above that I am lacking in my respect and admiration for our forbears in the Industry. Let no retired member of the profession feel injured or annoyed by my remarks. They have done a great job, and by their achievements and technical knowledge and research they have brought the Industry to its present great position, a position respected, admired grudgingly, perhaps, but still respected, by its greatest competitor, the electricity supply industry. But methods and processes have their day and changes take place almost overnight. Competition between industries moves faster and faster. Take transport as an example: first the stage coach, then the steam driven train, the electric and diesel-driven express rail coach, the motor car and 'bus, the aeroplane, and what of the future—will it be the rocket? Who knows? Discontent with present standards brings progress, and we must put aside without regrets the methods of the past if we are not to be left behind in the race for progress.

This race for progress exists not only between nations in their aim for higher standards of living, but also between industries, and even within the industries themselves. Recent enquiries into the conditions prevailing in some of our basic industries have revealed the need for this drastic change in their outlook. Take, for example, the two older industries of coal mining and cotton. These have old methods in their work and these methods have been left behind. Furthermore, the newer industries waiting to be developed are handicapped at the outset, since in many cases they are dependent on the older industries for supplies of raw materials. An industry old or new requiring coal, or gas and electricity derived from coal, is seriously handicapped if supplies are restricted or uncertain and, above all, high in price.

Now I would not be presumptuous in offering a solution of the coal problem, but I may be allowed to make suggestions as to how the present coal position might be improved. The Mining Industry must brighten up its ideas, boldly abandon old methods, and accept the new inventions and discoveries which can undoubtedly be of benefit to it. Political influences and differences must not be allowed to prevent this development and the present steep rise in the price of raw coal must be checked and more reasonable prices be the aim of the future. I would add that improved quality of coal would also follow as modern methods of cleaning coal were adopted.

Our own Industry is dependent on coal supplies. We fervently hope that at some not too distant date these will be forthcoming at a reasonable price and of suitable quality. As I write these notes the radio news bulletin informs me that the Ministry of Fuel and Power is to remain after the war, and that one of the main reasons for this is the necessity for the reorganization of the coal, gas, and electricity industries. We do not deny the need for this reorganization, although many people do not believe that the Ministry is the right authority to carry it out. It should be possible for an industry to reorganize itself to a state of efficiency provided it is sufficiently bold and is not hindered by political interference, either directly with itself or indirectly in the form of the assistance or aggrandizement of a competitor. Can we say in these days that any industry will be left without such political interference or support as the case may be? It may be argued that the welfare of the nation demands such measures. I could give many examples, such as civil aviation, which has created so much political controversy. One thing in my opinion stands out without possibility of denial so far as a public utility is concerned, and that it that unity of control is vitally necessary. On the subject of ownership of individual undertakings I will, wisely I believe, remain silent. On the major subject of post-war planning, this is, as I have previously said, as far as I will go.

My object in this Address is to indicate in connexion with post-war development how we should utilize to the very limit the technical resources available to us, and organize these in our works and undertakings for the future benefit of production and supply.

A comprehensive survey of how this should be done in connexion with the running of the retort house has been well set out by Mr. T. Campbell Finlayson, of the Woodall-Duckham Companies, in his Paper entitled "Scientific Control in the Retort House, and its contribution to National Fuel Economy," given to The Institution of Gas Engineers in June, 1942. I would refer anyone interested to this Paper and the discussion which followed and expanded on the subject-matter of the Paper. I would particularly draw attention to the question of instruments used in the control of carbonizing processes, and for that matter in all our processes. The man in charge of any chemical or physical process must, of necessity use instruments, but I suggest that he should have had a scientific training so as to be able to understand the working and mechanism of such instruments, particularly if they are recording instruments. The use of a CO_2 recorder and the interpretation of its results can hardly be compared with, say, the use of a micrometer by a mechanic, although both can be widely described as measuring instruments. The chemist and physicist knows only too well how easily his instruments can give erroneous readings, and the true works technician refuses to become a slave to his instruments. Recorders are often placed in bad situations, and either blindly believed or ignored in works where control is not in the hands of men with technical training and ability. Instruments, particularly recorders, must be well maintained. Then, and then only, a scientific observer can make valuable use of the data they provide. I have seen extensive installations of indicating and recording instruments, representing many hundreds of pounds, whose figures could give valuable information on the process they control, which for want of skilled attention are giving false readings in many cases. Charts are being regularly changed, often by an unskilled man, but no further attention is being given. This should not be so. Instruments, particularly recorders, can be of great assistance to the technician in saving much routine testing, but, as Mr. Finlayson rightly says, scientific control does not depend on the installation of a large number of complicated instruments. Some very pointed reference was made to recorders in the *Fuel Efficiency News* of the Ministry of Fuel and Power for February last. I will not quote the statements made, but they are worth reading.

The retort house should be definitely under scientific control. But what of the rest of the works? The greater proportion of our manufacturing costs are expended in the retort house, but by no means all. An old maxim in our Industry was "Profits are made in the retort house." What is the origin of this maxim I cannot say, but I would emphatically state that much money can be wasted in the retort house if proper skilled control is not exercised, and this applies to all other parts of the works. Purification, and particularly the removal of sulphuretted hydrogen and fixed sulphur compounds from the gas, is a subject much in the limelight to-day. I look forward to the day when town gas will be free from, or only contain a negligible amount of, sulphur compounds. Only then will the flueless heater be really satisfactory in use. Maintenance of water heaters and such apparatus will not be the difficult problem it often is to-day. Many chemists and physicists are to-day working on this problem, and I have no doubt of their ultimate success. New processes for gas purification will be introduced and handed over to our works chemists to control. In the development of new processes I would draw attention also to the importance of a knowledge of physics and physical chemistry in our Industry. This was admirably done by Mr. J. Albinson in his Presidential Address to the Manchester and District Junior Gas Association in 1937. His Address makes interesting and valuable reading, indicating in no uncertain manner how the physicist can help in the elucidation of many of our problems.

Many people before me have drawn attention to the scientific character and to the importance of technical control in the Gas Industry, and for that matter in almost all industries to-day there is more and more scientific control. The chemist and physicist are becoming of increasing importance.

The processing of coal will become more important as supplies of coal become more and more difficult to obtain. In developing new methods of gas manufacture, due regard to the ultimate result on the nation's fuel reserves must be given. Only by this means will our Industry get the support and credit due to it. As is the case in any

industry, only by the skilled application of correctly trained scientific minds to the problems, and the careful supervision of processes, can success and efficiency be attained. In September, 1943, the Minister of Fuel and Power in his fuel economy campaign stated: "The time has gone when we can afford merely to burn coal and allow its vast potentialities to go to waste." The Gas Industry has been saying this for many, many years, but it is comforting to hear it stated by a Minister, particularly one controlling a Ministry which is likely to have much to do with the future of our Industry.

Throughout my Address I have tried to develop my theme of the scientific nature of gas manufacture, and the importance to our Industry and to the country's fuel economy of skilled scientific control of our processes. But what of the men themselves who are to carry out the investigations and control in our Industry in the future? Their training is highly important, as is also the attracting of suitable men to our works. The academic training of the scientific personnel for our Industry is in the hands of the Education Committee of The Institution of Gas Engineers and of the various Universities and Technical Schools throughout the country. Some papers have been given on the subject, and articles have appeared in the Technical Press. Is our education scheme working along the right lines? Are we too conservative in the subjects and their extent included in our curriculum? Can we be bolder and include the wider study of some subjects and the addition of others? I personally would like to see more prominence given to the study of chemistry and physics, but then it might be said that this was due to my original training in chemistry. After due allowance for that fact, I still firmly believe in the importance of the chemist and physicist to the future development of our processes, and to the future uses of gas in home and industry.

The subject of the education and placing of the many young men from the Gas Industry whose careers have been interrupted by military service is being studied by the Education Committee and by many of us in the Industry. The results and proposals are being anxiously awaited by the men concerned. We must endeavour to retain these men for our service after the war and give them every encouragement for the future. Let them and the younger students wishing to enter industry as technical men see that the Gas Industry will make increasingly extensive use of technicians, with good prospects to the men concerned.

I cannot leave this subject without reference to the remuneration paid to such men, and to the prospect of fully trained and qualified men being selected for the higher positions. On the subject of remuneration much has been said and remains to be said. It seems to be an accepted idea, quite wrongly so, of course, that a young draughtsman or chemist in a gas-works, since he is a man who is getting some training from his employment, should be content to work for a relatively small salary. A mechanic is considered to be fully trained at 21 years old, and gets the recognized wage for his job. The gas-works technical man studies at least until he is 26, and often for years afterwards. He cannot sit for his diploma until he is 26. Often his salary is less than a mechanic's wage. This is particularly so to-day, when the salaries of officials are being only very grudgingly increased.

In municipally-controlled undertakings the salaries of technical men are often related to and controlled by the same committee, or Whitley Council, which controls clerical staffs, and which has little or no knowledge of the study and training required for such technical positions as those in a gas-works. Technicians in electricity undertakings, even those municipally owned, are as a rule paid salaries in accordance with a grade laid down by the electricity industry, and in general enjoy higher rates of pay than their corresponding officials in the Gas Industry. Surely the Gas Industry itself is the right authority to assess the value of its junior technicians, and I look forward to future efforts on the part of all concerned to secure this object. An individual gas engineer advertising for a technical man only very infrequently has any say in the salary to be offered, and often feels a sense of shame at having to mention a salary which he knows is incommensurate with the responsibilities of the position.

Finally I would urge all responsible for the staffing of gas undertakings to see to it that only men with the correct training and qualifications are selected for the higher positions. There is no denying the fact that appointments have been made with what would appear to the looker-on as complete disregard of the Institution and other diplomas held by the applicants. Diplomas are not everything, I know, but by the time a man has served the necessary period of training and passed the necessary examinations for the Diploma of The Institution of Gas Engineers, he has gone a long way towards qualifying for a position of responsibility in the Gas Industry.

The Lanark County Council, at their recent monthly meetings, have had under consideration the recommendations of the Housing Committee in regard to the use of gas or electricity in proposed housing developments throughout the county. The Council approved the decision that gas installations—*i.e.*, gas cookers, boilers, and refrigerators—be used in all houses erected in areas where gas supplies are available. With the exception of certain areas, the decision affects all gas supply undertakings in Lanarkshire, including the Council's own undertaking, Glasgow Corporation, Airdrie Corporation, Coatbridge Gas Company, Hamilton Corporation, Motherwell and Wishaw Corporation, and others.

Meters and Governors*

By G. W. WALES

FURTHER research is necessary on distribution. Our first objective must be to supply gas at a constant pressure to consumers' appliances. The method of varying initial pressures at the works and governor outstations, working to a predetermined daily timetable, is out of date and must give way to automatic control based on the actual demands for gas from hour to hour. It was a comparatively simple matter in those days when gas was used wholly for domestic purposes to vary initial pressures at set hours, but nowadays our commodity is in demand for all sorts of purposes other than domestic; therefore, the incidence of pressure loading throughout the day and night must be scientifically controlled. The development of flow meters with automatic control of pressures to meet fluctuating demands must be our aim if we are to achieve satisfactory results.

Let us consider low-pressure distribution systems, which are in general use in this country. In order to ensure a minimum pressure of 3 in. water gauge to all customers distant from the source of supply, it is necessary to carry higher pressures than are really required in the inner areas adjacent to the works or governor stations, unless special trunk or feeder high-pressure mains are laid to the outer areas, feeding into existing low-pressure mains through governors. This is quite a desirable practice provided the economies of the situation warrant it. But are we making the best possible use of our existing reticulations? These mains are capable of carrying higher pressures than are generally maintained, so why not take advantage of this fact within safety limits?

The provision of service governors would enable higher initial pressures to be carried, and thereby render the distribution system more elastic. In my opinion, the general use of service governors, linked up with automatic pressure control designed to meet fluctuating demands for gas, as against the out-of-date timetable method, would achieve the desired result and at the same time would not adversely affect the "unaccounted-for," since pressures would only be increased as the demand for gas rendered such necessary. An added, and a considerable, advantage from the use of low-pressure service governors would be that all appliances could be regulated or adjusted to function correctly at all periods. As it is, adjustments made during ordinary working hours are not satisfactory, inasmuch as variations in pressure occur at different hours, and these are most pronounced at domestic peak periods. We should make the best possible use of existing reticulations, so why not tackle the problem in a systematic manner?

The cost of maintaining service governors would be small when off-set against present-day costs of appliance adjustments without governors. In fact I would make bold enough to say that a general saving in cost would accrue to the undertaking. Apart from this, our service to the customer—which is of paramount importance—would be a real one, inasmuch as the pressure of gas at any time would be regular and not subject to variations.

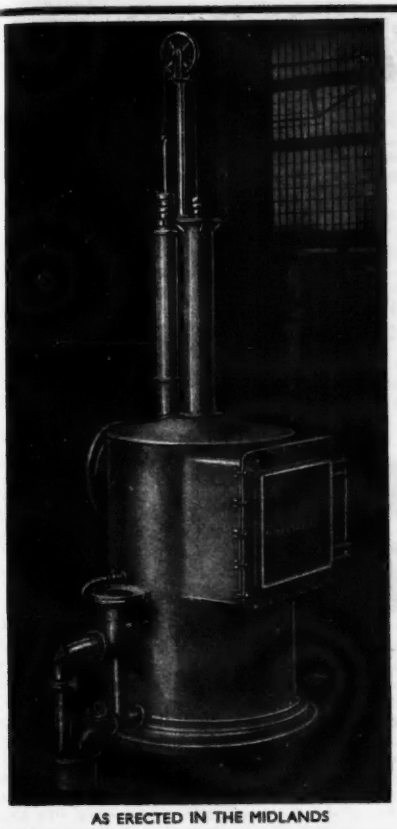
With direct high-pressure distribution, it is standard practice to install a governor on each service. This, of course, is essential. Whether we should or should not extend this practice to all consumers on low-pressure reticulation mains becomes a matter of policy to the undertakings concerned. My own view is that, if users of gas were conversant with the all-round advantage of a service governor, they would be prepared to pay for its installation, and particularly so if the cost were spread in twelve equal monthly payments over a year. The better procedure, however, would be the introduction of a service charge on lines similar to those adopted by the electricity undertakings. This would give gas companies the means whereby to install a service governor on each service as standard equipment.

Meters

Meters represent approximately 16%, or, in round figures, some £4,000,000 of the capital assets of the Gas Industry in Australia, and it is therefore fitting that special reference be made to this subject. Here, I venture the opinion that in the past we have not paid nearly enough attention to this all-important measuring instrument. The adoption of one standard domestic meter is long overdue—one capable of taking care of the consumption of an all-gas home up to, say, 300 to 350 cu.ft. per hour, and which will also accurately measure small consumptions, should be the aim. Surely it is not necessary to continue with some half-dozen sizes of domestic meters when one will suffice. It must be obvious to all that the adoption of a standard domestic meter by the Industry will reduce manufacturing and installation costs.

The Metropolitan Gas Company, which I have the privilege to serve, is as much at fault in this regard as other large undertakings. In Melbourne we manufacture and repair our own meters. Over the last decade we have developed high-capacity domestic meters of various types which, on test, have appeared to fulfil requirements but which on actual work in the district have proved quite unsatisfactory. This has not been so much a question of design—although there is room for improvement there—as of the selection of suitable materials for the working or moving parts. The troubles experienced have been

* From a Presidential Address to the Australian Gas Institute, December, 1944.



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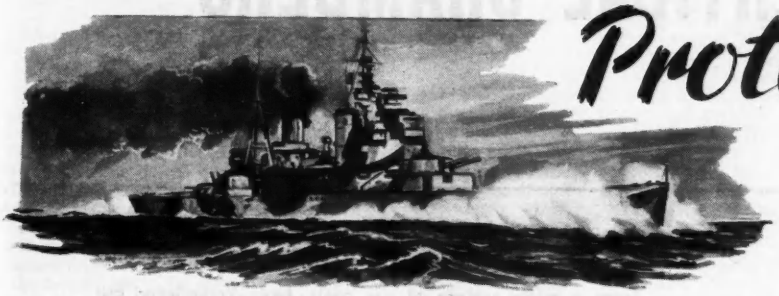

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due to harmful constituents in the gas manufactured, which affect the durability of certain metals. The remedy, of course, lies with the works of manufacturing stations. Neverthleless, the meter position is so important as to warrant a complete investigation by a panel of physicists and chemists, who should, I think, work in conjunction with a metallurgist.

The selection of the right materials is of paramount importance, and, with that end in view, it is suggested that the first step before we can commence research is a complete investigation of the causes of failures of existing types of meter in use in Australia. Statistics should be compiled by all the larger undertakings and the data pooled for the common good. I would strongly urge that earnest consideration be given to the appointment of a special panel such as I have proposed, and on which the meter manufacturers could be represented, if thought necessary or desirable.

Preliminary investigations with various metals used in meters have been carried out in the laboratory of the Metropolitan Gas Company. These reveal that copper, brass, bronze, and gunmetal have little resistance to corrosion from the constituents of coal gas, and that nickel, chromium, and cadmium plated brass are quite useless for internal meter parts. On the other hand, it has been found that stainless steel, aluminium, aluminium bronze, and tinplate are resistant to such corrosion, in that order.

Stainless steel is the best material to use, but it is expensive and difficult to work. Aluminium withstands corrosion to a remarkable degree, but does not stand up to wear and tear to the same extent as when mixed with copper in the form of aluminium bronze. Results obtained to date show that this alloy is the ideal for meter parts. Although aluminium bronze consists of 94% copper and 6% aluminium, the copper does not corrode when in contact with the gas, as it is protected by a thin film of aluminium oxide. I acknowledge my indebtedness to Mr. R. S. Andrews, Chief Chemist of the Metropolitan Gas Company, for his investigations into the question of suitable metals for meter parts.

In Melbourne we have used almost exclusively tin-case meters, but our experience generally with them has not been satisfactory because of leaky bodies. The success of the tin-case meter depends too much on the human element, in that the whole of the joints have to be hand-soldered. I do not know whether it is realized that, in a high capacity meter contained in what is known as a 5-light case, there are some 15 ft. of soldered seams, with the larger sizes correspondingly greater. These leaky bodies have been a continual source of trouble, and experience shows that complaints from customers arising from this source are increasing. The figures in Melbourne over a period of five years speak for themselves. During the war years the quality of the solder has suffered because the tin content has been compulsorily reduced, but there is no gainsaying the fact that workmanship has not been up to pre-war standard. The following figures are given:

Year.	Total number of meters fixed.	Number of meters changed for leaky bodies.	Percentage of total.
1938 ...	211,265 ...	2,014 ...	0.95
1939 ...	217,070 ...	2,170 ...	1.00
1940 ...	222,905 ...	2,115 ...	0.95
1941 ...	230,430 ...	2,233 ...	0.93
1942 ...	234,289 ...	2,526 ...	1.08

On the other hand, the cast iron meters which we have purchased and put into use on the district have been free of body leaks. The reason for this is, of course, that they have flanged joints raised and machined. The objection to the cast iron meter is its weight, which averages 40 lb., whereas the tin-case meter of similar capacity weighs just over 14 lb. The general use of cast iron meters would thus involve increased transport charges, but this disadvantage is more than offset by the advantages to be gained. The casing is everlasting, and they are much simpler to dismantle for repairs and renewals. My considered opinion is that the tin-case domestic meter has had its day.

This does not, however, mean that we should regard the cast iron meter as the last word. We should seek to reduce its weight by substituting for cast iron a reasonably light metal alloy, which will give long life in service, consistent with cost. One can visualize that, in the not too far distant future, plastics will be used extensively for such a purpose. The phenol-formaldehyde or bakelite group in this field appears to present possibilities. It can already be produced at a lower price than others. The plastic known as Duperite Laminite, which has a strong paper base laminated material, is suitable for structural and mechanical applications. It is being fabricated in Australia in 19 thicknesses ranging from $\frac{1}{32}$ in. to 2 in., and can be made in any colour. It has a tensile strength of 12,500 lb., a flexural strength of 2,100 lb., and a compression strength of 35,000 lb. per sq. in., and can be readily moulded. It is also interesting to note that tubes threaded, and with the necessary connexions, are being produced in Melbourne with this material for chemical plants, and it might be that before long such tubes will be utilized for internal gas installations. Quite a number of gas undertakings in the United States of America have used bakelite valves for meters since the outbreak of war, and the considered opinion is that they have advantages over metal valves in that they eliminate noise, wear, and, most important, they are less susceptible to gum drag, and lift more easily.

The development of plastics has been one of the high lights of the past five years, and we all know how the results obtained have been applied to aeroplane construction. We have been told by those folk in the best position to know that plastics will be produced immediately after the war at a sufficiently low price to permit them to be used extensively for motor car bodies. If that is so, why not for meters and other gas equipment? The potentialities are well worth keeping in mind.

Association of Smaller Municipal Undertakings

The Association of Smaller Municipal Gas Undertakings, at the invitation of the Minister of Fuel and Power, gave oral evidence before the Heyworth Committee on April 23 in support of their two Reports, dated December, 1943, and August, 1944.

The Members of the Committee of the Association who appeared before the Heyworth Committee were Messrs. F. J. Harrison, Chairman of the Newcastle-under-Lyme Gas Committee; F. G. Shaw, late Gas Engineer to the Buxton Corporation; A. B. Glasspool, late Clerk to the Market Harborough U.D.C.; C. E. Dickenson, Gas Engineer, Widnes; and F. L. Wimhurst, Newcastle-under-Lyme, Hon. Secretary of the Association.

At a Meeting some little time ago the Executive Board of the American Gas Association decided to cancel all national conferences and conventions. Nine meetings formerly arranged to be held up till next June were cancelled to aid the war effort. At the same meeting it was announced that in less than 90 days gas undertakings throughout America had underwritten an expanded research and promotional programme calling for an expenditure of $1,400,000 a year for three years.

The Following recently issued British Standard Specifications may be obtained on application to the Secretary, Institution of Gas Engineers, 1, Grosvenor Place, S.W. 1:—B.S. 567.1945: Asbestos cement spigot and socket flue pipes and fittings, price 2s. net, post free. B.S. 1211.1945: Centrifugally cast (spun) iron pipes for water, gas, and sewage, price 2s. net, post free.

A Stirring Story of the part played by the Clyde anchorage served by Greenock and Gourock during the time when London, Liverpool, and other English ports were being heavily blitzed was told in an article in the *Greenock Telegraph and Clyde Shipping Gazette* of April 17. It became the "No. 1 Port" of Britain, and for a long period the most important port in the world—a gateway through which poured men and supplies, a life-line which fed the fighting fronts all over the world.

J. Brockhouse & Co., Ltd., have opened a Sales Office in Manchester for the purpose of dealing with enquiries and sales of the whole of the Brockhouse Organization covering Northern England. The address is Eagle House, 30, Cross Street, Manchester, 2. Telephone: Blackfriars 2123–4. Telegraphic address: Brockhouse, Manchester.

Associated Gas and Water Undertakings, Ltd., recommend a final dividend of 2½% actual, less tax, on the Ordinary Stock, making, with the interim dividend already paid, 5% actual, less tax, for the year ended March 31 (same), and a final dividend on the Deferred Stock of 3% actual, less tax, making with the interim dividend already paid, 6% actual, less tax, for the year ended March 31 (same). They also announce that the net profit for the year, subject to audit, amounts to £62,980, compared with £65,861 last year.

Many Tributes to service rendered were paid when, at the Westgate Hotel, Newport, Newport (Mon.) Gas Company's Home Guard and Civil Defence units were guests of the Chairman (Colonel Julian Day, M.C.) and Directors at a dinner to celebrate their "stand down." In the unavoidable absence of Colonel Day, the Deputy Chairman (Mr. R. Wilson Bartlett, J.P., F.S.A.A.) presided. A toast to the Home Guard and Civil Defence of the Company was submitted by the General Manager and Secretary (Mr. R. S. Snelling, J.P., F.C.I.S.). He had been sufficiently close to the units to appreciate what their service had meant not only to personnel concerned, but to the Company.

Mr. R. Wilson Bartlett, J.P., Deputy Chairman of the Company, presided at an informal luncheon at the Board Room of the Newport (Mon.) Gas Company, when the name of Mr. H. Haley was inscribed on the Company's Roll of Honour for 50 years' service, and he was presented with the Long Service Certificate. Others present were Messrs. C. O. Lloyd and R. J. Auckland, Directors of the Company, R. M. Jones, H. E. Jones, E. Phillips, C. Collins and W. Powell, surviving employees whose names appear on the roll of honour, R. S. Snelling, J.P., General Manager and Secretary, J. F. Rust, Engineer, and W. E. Crowley.

A New Brochure has been issued by the Metronic Instrument Co., Ltd., giving brief particulars of a series of standardized instruments lately introduced. The series includes indicators for measuring gas and air rates of flow at both low and high pressures, and a complete range of pressure and vacuum indicators, covering 0–1 in. W.G., up to 0–10 tons per sq.in. Flow and pressure indicators can also be supplied in semi-portable form, with handle suitable for carrying round the works. The weight, water-filled, of a flow meter is 40 lb. The scales of both flow and pressure indicators are uniformly graduated in flow and pressure units respectively. Flow calibration is effected to B.S. 1042, with one or two refinements not dealt with in that specification.

GAS PRODUCTS PRICES

The London Market April 30.

As from March 5, by the Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), the maximum price of Pitch for briquetting has been increased to 60s. per ton f.o.r. supplying works, and the prices for Road Tar, as fixed by the Coal Tar Products Prices Order, 1943, S. R. & O. No. 1528, have been increased by one half-penny per gallon. There is also an increase of 5s. per ton in the price of standard Creosote/Pitch Mixture.

The prices of other products are unchanged.

Control of Benzole and Coal Spirit Order, 1944 (S.R. & O. 1944, No. 172), is in force.*

By this Order the price of Motor Benzole is fixed at 2s. per gallon. The Order also lays down the method of evaluating Crude Benzole, and calls for periodical returns to the Ministry of Fuel and Power from all producers of Crude and Refined Benzole.

Control of Toluene (No. 4) Order, 1944 (S. R. & O. 1944, No. 170), contains an amendment of the Control of Toluene (No. 3) Order, 1943.

There is also the Control of Benzole and Coal Spirit (No. 2) Order, 1944 (S. R. & O., No. 988).

Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O., 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene.

* Slightly amended by Control of Benzole and Coal Spirit (No. 2) Order, 1944.

The Provinces April 30.

The average prices of gas-works products during the week were : Pitch and Crude Tar,* Toluole, naked, North, 90's, 2s. to 2s. 2½d., pure, 2s. 9d. (now controlled by S. R. & O. 1944, No. 988, operative from Sept. 1, 1944. Benzole and Coal Spirit, also Coal Tar Naphtha and Xylole, are now controlled by the Control of Benzole and Coal Spirit Order, 1944, dated Feb. 18, 1944, S. R. & O. 1944, No. 172, operative from March 1, and S. R. & O. 1944, No. 988, part 1, operative from Oct. 1, 1944, Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943, Naphthalene now controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

Attention is called to Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), referred to on p. 305, "JOURNAL" of March 7.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland April 28.

Throughput is well maintained in the home market. Refined tar*: Yield to distillers is 5d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d.; hydrogenation oil,* 5¾d.; low gravity or virgin oil,† 7¼d. to 7½d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 6½d. to 7d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 2d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

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GAS STOCKS AND SHARES

The Budget gave a fillip to stock markets and the volume of business was greater than during the previous week. British Funds continued to harden and industrials were strong, while towards the close Kaffirs also came into the picture with a rally. A feature was the demand for the shares of those companies benefiting from the double taxation relief agreement with U.S.A.

There was also more business done in the Gas Market, where prices with only two exceptions continued firm, although it will be seen below that only a few quotations were changed. Compared with a month ago, however, several good features can be noted. There was a heavy demand for Imperial Continental on the excellent war news and the price improved 8 points, so also did Portsmouth consolidated, while Mid-Southern Utility "C" stock gained 7. On the Provincial Exchanges all the leading stocks showed improvement and the three Great Grimsby stocks closed 15 points higher.

The following were the changes during the past week:

OFFICIAL LIST

British 5½ p.c. "B" Cum. Pref. ...	112—117	+3
Croydon Sliding Scale	123—128	+1
Ditto 5 p.c. Deb.	125—130	+2
Gas Light Units	23/3—24/3	—-/3d.
Ditto 5 p.c. Red. Deb.	108—111	+½
Imperial Continental	118½—121½	+½
Oriental (x.d)	155—160	Apl. 23
Primitiva Holdings	12/9—13 9	—-/9d.
South Suburban Ord.	117—122	+2

PROVINCIAL EXCHANGE

Newcastle Units	26/9—27/3	+-/4½d.

Quotations on the London and Provincial Stock Exchanges

OFFICIAL LIST

Issue. £	When ex-Dividend.	Dividends Interest. Amnt. or Rate% Prev. Hf. Yr. Actual.	Last Hf. Yr. Actual.	NAME.	Quotations April 26
1,767,439	March 12	20/-	20/-	Alliance & Dublin Ord. ...	117—122
891,664	Oct. 23	6d.	6d.	Assoc. Gas & Water U'd'ts Ord.	23/—24 —
388,938	,,	7½d.	7½d.	Do. Deferred	23/6—24/6
500,000	March 12	2½	2½	Do. 4½ p.c. Red. Cum. Pref.	21/—22/-
535,545	,,	2	2	Do. 4 p.c. Red. Cum Pref.	20/—21/-
341,966	,,	2	2	Do. 4 p.c. Irred. Cum. Pref.	18/3—19 3
561,370	Feb. 19	70/-	70/-	Barnet Ord. 7 p.c.	159—164
300,000	Oct. 9	10½d.	8½d.	Bombay, Ltd.	43/—48/-
690,407	Feb. 5	70/-	70/-	Bournemouth 7 p.c. max. ...	157—162
362,025	Dec. 11	2	2	Do. 4 o.c. Deb. ...	102—107
659,955	March 5	25/-	57/-	Brighton, &c., 5 p.c. Con. ...	106—111
855,000	,, 12	60/-	60/-	Brit. Gas Light Ord.	132—137
545,000	Dec. 18	2½	2½	Do. 5½ p.c. 'B' Cum. Pref.	115—120
120,000	,,	2	2	Do. 4 p.c. Red. Deb.	95—100
10,000	April 23	9/-	4/6	Cape Town, Ltd., 4½ p.c. Cu. Pf.	
626,860	Feb. 12	70/-	70/-	Cardiff Con. Ord.	122—127
24,500	Nov. 13	8½d.	8½d.	Colombo 7 p.c. Pref.	22/6—24/6
764,169	March 19	4.78d.	4.78d.	Colonial Gas Assn. Ltd. Ord. ..	16/6—18/6
400,000	,,	7.649d.	7.649d.	Do 8 p.c. Pref. ...	22/—24/-
1,748,090	July 22 '40	30/-	30/-	Commercial Ord.	63—68
620,000	Dec. 11	1½	1½	Do. 3 p.c. Deb.	74—79
286,344	Feb. 19	2½	2½	Do. 5 p.c. Deb.	110—115
807,560	,,	60/-	60/-	Croydon sliding scale	124—129
644,590	,,	50/-	50/-	Do. max. div.	107—110
620,385	Jan. 2	2½	2½	Do. 5 p.c. Perp. Deb. ...	125—130
179,500	Feb. 12	50/-	50/-	East Surrey 'B,' 5 p.c.	103—108
176,461	Dec. 27	2½	2½	Do. 5 p.c. Deb. (Irred.)...	124—129
239,135	Nov. 13	6d.	6d.	Gas Consolidation Ord. 'A' ...	22/6—23/6
250,000	,,	4½	4½	Do. Ord. 'B' ...	22/3—23/3
250,000	,,	2	2	Do. 4 p.c. Red. Cum. Pref.	18/6—20/6
19,101,877	Feb. 19	6d.	6d.	Gas Light & Coke Ord. ...	23 3—24 3d
2,600,300	,,	35/-	35/-	Do. 3½ p.c. max.	81½—84½
4,477,106	,,	2	2	Do. 4 p.c. Con. Pref. ...	102—105
2,993,000	Jan. 8	1½	1½	Do. 3½ p.c. Red. Pref. ...	101—104
8,602,497	Nov. 27	1½	1½	Do. 3 p.c. Con. Deb. ...	90 93
3,642,770	,,	2½	2½	Do. 5 p.c. Red. Deb. ...	108—111
3,500,000	,,	2½	2½	Do. 4½ p.c. Red. Deb. ...	107½—110½
700,000	March 12	1½	1½	Do. 3½ Red. Deb. ...	99—101
5,600,000	May 13 '40	80/-	80/-	Imperial Continental Cap. ...	118½—121½
41,820	Jan. 29	1½	1½	Do. 3½ o.c. Red. Deb. ...	97—100
2,167,410	Feb. 12	50/-	60/-	Liverpool Ord.	126—129
231,978	,, 19	50/-	50/-	M.S. Utility 'C' Cons.	110—115
918,657	,,	2	2	4 p.c. Cons. Pref.	101—104
675 000	Nov. 13	‡40/-	‡40/-	Montevideo, Ltd.	88—91
300,000	April 23	£6	£4	Oriental, Ltd.	155—160
368,537	Dec. 11	57/6	50/-	Plymouth & Stonehouse 5 p.c.	113—118
621,667	Feb. 5	72/6	72/6	Portsmouth & Gosport Cons.	153—158
2,381,363	May 15	†9½d.	†9½d.	Primitiva Holdings, Ltd. Ord.	12 9—13/9
233,900	Dec. 11	3	3	Do. 6½ p.c. Red. Cum. Pref.	99—104
648,999	Sept. 11	6½	6½	Severn Val. Gas Cor. Ld. Ord.	23/—24/-
597,972	March 12	2½	2½	Do. 4½ p.c. Cum. Pref. ...	21 6—22/6
2,528,714	Aug. 21	6d.	3½d.	South East'n Gas Cn. Ld. Ord.	22/6 23/6
1,000,000	Feb. 26	2½	2½	Do. 4½ p.c. Red. Cum. Pref.	21/9—22/9
1,068,869	,,	2	2	Do 4 p.c. Irred. Cum. Pref.	20/—21/-
6,709,895	Feb. 12	†20/-	†40/-	South Met. Ord.	95—97
1,135,812	,,	3	3	Do. 6 p.c. Irred. Pref. ...	127—132
850,000	,,	2	2	Do. 4 p.c. Irred. Pref. ...	101—104
1,895,445	Jan. 2	1½	1½	Do. 3 p.c. Perp. Deb. ...	87—90
1,000,000	,, 15	2½	2½	Do. 5 p.c. Red. Deb. ...	103—108
1,543,795	Feb. 5	50/-	50/-	South Suburban Ord. 5 p.c ...	117—122
512,825	,,	2½	2½	Do. 5 p.c. Perp. Pref. ...	113—118
500,000	,,	2	2	Do. 4 p.c. Perp. Pref. ...	100—105
250,000	,,	1½	1½	Do. 3½ p.c. Red. Pref. ...	93—98
888,587	Dec. 11	2½	2½	Do. 5 p.c. Perp. Deb. ...	123—128
750,541	Feb. 5	50/-	50/-	Southampton Ord.	105—110
350 000	,, 12	2½	2½	Swansea 5½ p.c. Red. Pref. ...	105—110
1,076,490	,, 26	50/-	50/-	Tottenham & District Ord. ...	121—126
338 555	,,	2½	2½	Do. 5 p.c. Pref.	113—118
453,380	Dec. 11	2	2	Do. 4 p.c. Perp. Deb. ...	100—105
1,247,505	Nov. 6	7½d.	6d.	U. Kingdom Gas Cor. Ord. ...	23/9—24/9
1,085,952	,, 13	5½d.	5½d.	Do. 4½ p.c. 1st Cum. Pref. ...	23/—24/-
772,709	,, 13	4½d.	4½d.	Do. 4 p.c. 1st Red. Cum. Pref.	19/—21/-
745,263	Dec. 18	5½d.	5½d.	Do. 4½ p.c. 2nd Non. Cum. Pf.	20/—21/-
1,200,000	March 19	1½	1½	Do. 3½ p.c. Red. Deb. ...	97—102
380,606	Aug. 14	66/3	66/3	Uxbridge, &c., 5 p.c.	123—128
1,371,138	Feb. 12	50/-	50/-	Wandsworth Consolidated ...	122—127
2,525,768	,,	2	2	Do. 4 p.c. Pref.	101—104
1,343,964	Dec. 18	2½	2½	Do. 5 p.c. Deb.	126—133
383,745	,,	2	2	Do. 4 o.c. Deb.	100—105
558,342	Feb. 12	50/-	50/-	Watford & St. Albans Ord. ...	120—125

SUPPLEMENTARY LIST

Issue. £	When ex-Dividend.	Dividends Interest. Amnt. or Rate% Prev. Hf. Yr. Actual.	Last Hf. Yr. Actual.	NAME.	Quotations April 26
351,685	Dec. 18	2½	2½	Brighton, &c., 5 p.c. Perp. Deb.	123—128
415,250	,,	2	2	Bristol Gas Co., 4 p.c. New Deb.	100—103
140,205	Feb. 12	70/-	70/-	Cambridge, &c., 7 p.c. Cons. 'B'	140—145
295,932	March 12	50/-	50/-	Cheltenham, 5 p.c. Cons. Ord....	103—108
42,500	Dec. 18	2	2	Do. 4 p.c. Perp. Deb....	98—103
150,000	Feb. 19	2	2	Croydon Gas, 4 p.c. Pref. (Irr.)	98—103
130,000	Jan. 2	2	2	Do. 4 p.c. Deb ...	100—105
53,220	Feb. 12	3	3	East Surrey, 6 p.c. Cum. Pref....	120—125
...	Aug. 19 '40	40/-	40/-	Eastbourne, 'B' 3½ p.c.... ..	97—102
117,425	March 1	—	£6	East Wight Cons. 5 p.c. ...	100—105
25,000	Dec. 18	2½	2½	Guildford 4½ p.c. Red. Deb. ...	100—105
156,600	Feb. 19	50/-	50/-	Hampton Ct., 5 p.c. Cons. Ord.	100 -105
18,000	Dec. 29 '41	3½	3½	Malta & Med'n., 7 p.c. 1st Pref.	47—52
10,845	June 30 '41	37/6	37/6	Do. 7½ p.c. 2nd Pref.	47—52
50,000	Feb. 19	52/3	52/3	Mid. South. Util., 'A' Cons. 5 p.c.	107—112
70,380	Dec. 18	2½	2½	Newport (Mon.), 5 p.c. Deb....	115—120
65,000	Aug. 14	2½	2½	North Middlesex, 5 p.c. Pref....	110—115
70 000	March 12	2½	2½	Plymouth & Stone., 5 p.c. Deb.	124—129
76,501	Dec. 18	2	2	Reading, 4 p.c. Perp. Deb. ...	97—102
74,777	April 3	2	2	Romford, 4 p.c. Debs. (Reg.) ...	97—102
21,000	Dec. 4	2½	2½	Slough, 5 p.c. Perp. Deb. ...	122—127
211,740	,, 11	2½	2½	Southampton, 5 p.c. Red. Deb.	105—110
363,575	Jan. 2	2½	2½	Tottenham, 5 p.c. Reg. Red. Mt.	98—102
202,019	April 23	75/-	75/-	Tunbridge Wells, 4 p.c. Scale ...	125—130
135,257	Dec. 4	2½	2½	Uxbridge &c., 5 p.c. Perp. Deb.	123—128

PROVINCIAL EXCHANGES

					Quotations April 23
804,948	March 5	2½	2½	Bath Cons.	114—116
122,577	Feb. 19	2½	4½	Blyth 5 p.c Ord.	124—126
1,647,250	,, 12	2½	2½	Bristol, 5 p.c. max.	120—121
120,420	Dec. 18	2	2	Do. 1st 4 p.c. Deb	101—103
415,250	,,	2	2	Do. 2nd 4 p.c. Deb. ...	100½—102½
328,790	,,	2½	2½	Do. 5 p.c. Deb.	121—123
157 150	Feb. 12	3½	3½	Chester 5 p.c. Ord.	112½—116½
52,500	Dec. 18	2	2	Do. 4 p.c. Cum. Pref. ...	99—101
40,000	,,	2	2	Do. 4 p.c. Non. Cum. Pref.	99—101
36,430	,,	1½	1½	Do. 3½ p.c. Deb.	88—92
41,890	,,	2	2	Do. 4 p.c. Red. Deb. ...	100—102
542,270	Feb. 14	3	4½	Derby Cons.	135—140
55,000	Dec. 18	2	2	Do. 4 p.c. Deb.	97—102
40,000	Feb. 19	5½	5½	Exeter 10 p.c.	185—195
10,000	,,	5	5	Great Grimsby 'A' Ord. ...	175—185
6,500	,,	5	5	Do. 'B' Ord. ...	175—185
79,000	,,	5	5	Do. 'C' Ord. ...	165—175
732,000	Feb. 19	2	2	Hartlepool G. & W. Co. & New	92—94
490,681	Dec. 18	1½	1½	Liverpool 3½ p.c Red. Deb. Stk.	95—100
245,500	,,	2	2	Do. 4 p.c. Red. Deb. Stk.	102—103
306,083	Jan. 2	2	2	Do. 4 p.c. Deb.	103—105
680,000	Dec. 18	2½	2½	Do. 5 p.c. Red. Stk. ...	104—109
20,000	,,	2½	2½	Long Eaton 5 p.c. Pref.	9—11
80,000	,,	2½	2½	Do. 5 p.c. Deb.	117—122
2,430,267	Feb. 12	6d.	6.9d.	Newcastle and Gateshead Con.	26 9—27/3a
682,856	,,	2	2	Do. 4 p.c. Pref.	101½—104½
776,706	Dec. 27	1½	1½	Do. 3½ p.c. Deb.	101—102
250,000	,,	1½	1½	Do. 3½ p.c. Red. Deb. ...	97½—99½
73,186	April 23	2	2	Do. 4 p.c. Red. Deb. ...	102—104
106,280	Feb. 15	5	5	Preston 'A' 10 p.c.	170—175
188,219	,,	3½	3½	Do. 'B' 7 p.c.	132—135
1,806,339	Feb. 25	3½	3½	Sheffield Cons.	150—152
95,000	Jan. 2	2	2	Do. 4 p.c. Deb.	98—102
332,351	Feb. 5	3	3	Sunderland 6 p.c. max. ...	121—123
192,150	,, 12	2½	2½	Weston-super-Mare Cons. ...	111—113
64,338	Jan. 2	2	2	Do. 4 p.c. Deb.	99—101
33,340	,,	3½	3½	Do. 7½ p.c. Deb.	145—150

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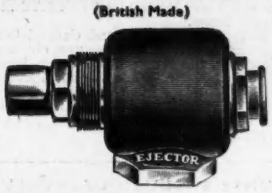

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Address No. 9430, "GAS JOURNAL," 51, High Street, Esher, Surrey.

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CHEMIST requ'..ed for Coke Oven and By-Product Plant in the Lancashire area. Experience in the refining of Benzole and Tar Distillation essential. Salary offered £225 per annum, plus existing bonuses, which increase this to £300 at the present time.
Apply, giving full particulars of Age, Training and Experience to No. 9429, "GAS JOURNAL," 51, High Street, Esher, Surrey.

BOROUGH OF LEIGH

GAS AND WATER DEPARTMENT

APPOINTMENT OF DISTRIBUTION SUPERINTENDENT

APPLICATIONS are invited for the appointment of a GAS DISTRIBUTION SUPERINTENDENT at a commencing Salary of £320 per annum, rising, subject to satisfactory service, to £350 per annum by annual increments of £15, plus War Bonus. The person appointed to the position will be required to carry out such duties relating to Water Distribution as the Gas and Water Engineer and Manager may direct.

Applicants should be experienced in all branches of distribution, including high and low pressure systems, and be capable of preparing schemes and estimates for extensions. They should also be capable of supervising staff.

The appointment will be determinable by one month's notice on either side and subject to the provisions of the Local Government Superannuation Act, 1937, the Corporation's Sick Pay Scheme, and to the successful applicant passing a medical examination to be conducted by the Medical Officer of Health.

Canvassing directly or indirectly will be a disqualification.

Applications, stating Age, Qualifications, Experience, length of notice required to terminate present employment, and position in relation to National Service, accompanied by *copies* of two recent Testimonials, are to be delivered to the undersigned, not later than the first post on May 17, 1945.

Town Hall, Leigh, Lancs. April 21, 1945.

ALBERT JONES, Town Clerk.

THE BANBURY GASLIGHT AND COKE COMPANY

ENGINEER AND MANAGER

APPLICATIONS are invited for the above position at a commencing Salary of £600 per annum, inclusive of present war bonus.

Candidates must be Corporate Members of The Institution of Gas Engineers with previous experience of Gas-Works Management, Gas Distribution and Sales.

Applications and Testimonials should be addressed to the undersigned for receipt not later than May 19, 1945.

The South Midland Gas Corporation, Ltd., Therm House, St. Aldates, Oxford.

ALEXANDER TRAN, General Manager.

BURGH OF PAISLEY

(GAS DEPARTMENT)

APPLICATIONS are invited for the Position of TECHNICAL (ENGINEERING) ASSISTANT. The Salary grade prescribed for the post is £240, rising to £340 per annum by increments of £20 subject to satisfactory service, with placing according to experience, plus the current war bonus of £60 per annum. The post is subject to the provisions of the Local Government Superannuation Act, and the successful applicant will require to pass a medical examination.

Applicants must be competent draughtsmen and must possess the Higher Grade Certificate of The Institution of Gas Engineers in Gas Engineering (Manufacture), or equivalent. Applications, stating Age, Training, Experience, and Qualifications, together with applicant's position in relation to the Essential Work Orders and National Service Acts, and accompanied by *copies* of three recent Testimonials, should be addressed to undersigned for receipt not later than Saturday, May 12, 1945.

This advertisement is issued under authority from the Ministry of Labour and National Service.

The Gas-Works, Paisley, Renfrewshire.

SYDNEY SMITH, Engineer and Manager.

APPOINTMENTS VACANT (ctd.)

RHYMNEY AND ABER GAS COMPANY

APPLICATIONS are invited for the Position of FOREMAN MAIN AND SERVICE LAYER. Applicants must have had practical experience in the laying of High and Low Pressure Mains in Cast Iron and Steel, and also in the installation and maintenance of District Governors, with some experience in the handling of Contractors' work. Wages £5 5s. per week.

Applications, stating Age, Experience and position regarding the Essential Works Order, together with *copies* of two Testimonials, to be forwarded to the undersigned not later than May 19, 1945.

Gas Offices, Caerphilly, Glam.
BARTON GRAINGER, Engineer, General Manager and Secretary.

THE BOMBAY GAS COMPANY, LIMITED

APPOINTMENT OF ASSISTANT MANAGER

THE above Company invites applications for the position of DEPUTY ENGINEER and MANAGER. The total output is about 1,000 millions of cubic feet per annum.

Applicants should be preferably under 35 years of age and will be required to pass a medical examination.

Applicants should have had experience in carbonization with horizontal or vertical retorts and water gas manufacture, Works Maintenance, handling of labour and some knowledge of administration.

The engagement would be for four years in the first instance, of which the last six months would be on leave at full pay. Passage out and home would be paid, including wife and children (if any).

The basic Salary offered is approximately £1,250 plus a cost of living allowance, the present allowance being £180 without children or £225 with children, together with free gas, coal, and electricity. If the Company provide unfurnished living accommodation a deduction of £120 per annum will be made and the official will pay his own income tax, the effective rate of which is now about 3s. 6d. in the £.

Applicants must give details of Training, Experience, present position held, and state their position under the Essential Works Order.

Applications should be accompanied by *copies* of two Testimonials or names to whom reference can be made, and should be addressed to The Chairman, Bombay Gas Company, Limited, 279/281, Gresham House, Old Broad Street, London, E.C. 2, not later than May 28, 1945.

By Order of the Board,
E. COMBER, Secretary.
April, 1945.

THE BOMBAY GAS COMPANY, LIMITED

APPOINTMENT OF PUBLIC LIGHTING SUPERINTENDENT

THE above Company invites applications for the position of PUBLIC LIGHTING SUPERINTENDENT.

Applicants should be preferably under 35 years of age, and will be required to pass a medical examination.

At present there are 9,095 gas lamps in the area of supply, mostly low pressure, the Company being responsible for the lighting and extinguishing (according to the prescribed Schedule), also for the maintenance of the lamps and the illumination to a specified standard.

Applicants should be experienced in the duties appertaining to the above matters, including the administration of the department and the control of lamplighters and maintenance fitters. He should be familiar with the principles and practice of illumination, and preferably have some knowledge of medium pressure gas lighting. He will also be responsible for the costing of the work of his department in collaboration with the accountant.

The engagement will be for four years in the first instance, of which the last six months will be on leave at full pay. Passage out and home will be paid, including wife and children (if any).

The basic Salary offered is approximately £800 per annum, plus a war-time cost of living allowance of £180 (if no children) or £225 with children. In addition, free gas, coal, and electricity is allowed. The official will pay his own income tax (the present effective rate being about 2s. 6d. in the £), and will pay the Company £60 per annum for unfurnished accommodation.

Applications should be accompanied by *copies* of two Testimonials or names to whom reference can be made, and should be addressed to The Chairman, Bombay Gas Company, Ltd., 279/281, Gresham House, Old Broad Street, London, E.C. 2.

By Order of the Board,
E. COMBER, Secretary.
April, 1945.

APPOINTMENTS VACANT (ctd.)

SENIOR DRAUGHTSMAN required by London Gas Undertaking. Good knowledge of all types of Gas-Works plant essential. Salary £9-£10 per week, including Cost of Living Bonus. Excellent prospects.

Applications, giving full details of Experience and position under the Essential Works Order, to No. 9431, "GAS JOURNAL," 51, High Street, Esher, Surrey.

CONTRACTS OPEN

URBAN DISTRICT COUNCIL OF MARPLE

(GAS UNDERTAKING)

TENDERS are invited for the Supply, Delivery and Erection of a HIGH PRESSURE STORAGE PLANT with a working pressure of 60 lb. per sq.in. The plant should have a storage capacity of 10,000 cu.ft., together with a 2,000 cu.ft. per hour compressor with electric drive and fully automatic controls for compression and redistribution.

Further particulars may be obtained on application to G. E. H. Keillor, M.Inst.Gas E., M.Inst.F., Engineer and Manager, Gas-Works, Marple Bridge, Cheshire.

Tenders, which must be enclosed in a plain sealed envelope and endorsed "High Pressure Storage Plant," must reach the undersigned not later than Wednesday, May 9, 1945.

The Council do not bind themselves to accept the lowest or any Tender.

Council Offices, Marple.
L. GREENALL, Clerk of the Council.
April, 1945.

COUNTY BOROUGH OF DARLINGTON

(GAS DEPARTMENT)

TENDERS are invited by the above for the Supply, Delivery and Erection, at their Valley Street Works, of a 3-million cu.ft. SPIRAL GUIDED GASHOLDER, in a Steel Tank upon a Reinforced Concrete Raft and Piled Foundation.

Alternative Tenders may be submitted for riveted or welded construction.

Specification, Conditions of Contract, Drawing and Form of Tender may be obtained from the Gas Engineer, Mr. A. E. Ruffhead, A.M.Inst.C.E., John Street, Darlington, upon the deposit of a sum of £2 2s. This deposit will be returned upon the receipt of a *bona fide* Tender.

Tenders in a plain sealed envelope, endorsed "Tender for Gasholder," to be delivered to the undersigned not later than May 18, 1945.

The Corporation do not bind themselves to accept the lowest or any Tender.

11, Houndgate, Darlington.
H. HOPKINS, Town Clerk.

COUNTY BOROUGH OF DARLINGTON

(GAS DEPARTMENT)

TENDERS are invited for the PAINTING of a Gasholder, Tower Scrubbers, Annular Condensers, Telpher Installation, Coke Hoppers and Structure.

Specification and Form of Tender may be obtained from Mr. A. E. Ruffhead, A.M.Inst.C.E., Engineer and Manager, Gas-Works, John Street, Darlington.

Tenders in a plain sealed envelope, endorsed "Tender for Painting," to be delivered to the undersigned not later than May 18, 1945.

The Corporation do not bind themselves to accept the lowest or any Tender.

11, Houndgate, Darlington.
H. HOPKINS, Town Clerk.

BOROUGH OF DROITWICH

TENDERS are invited for the supply, delivery, and erection of the following:

BLUE WATER GAS PLANT, maximum capacity approximately 250,000 cu.ft. per diem, minimum capacity 60,000 cu.ft. per diem, with automatic relief device to work to inlet exhauster.

STEAM BOILER, rated capacity 1,500 lb. of steam per hour.

Further particulars, Specifications, and Conditions of Contract may be obtained upon application to Mr. G. D. Humphries, Gas Engineer and Manager, the Gas Department, Friar Street, Droitwich.

Tenders, in plain sealed envelopes, endorsed "Blue Water Gas Plant" and "Steam Boiler" respectively, should be delivered to the Town Hall not later than Tuesday, May 8, 1945.

The Town Hall, Droitwich.
ARTHUR V. HOLYOAKE, Town Clerk.

COUNTY BOROUGH OF OLDHAM

HIGGINSHAW GAS-WORKS

THE Oldham Corporation Gas-Works Committee is prepared to receive tenders for the PREPARATION and PAINTING of steel and ironwork of the plant and structures at the Higginshaw Gas-Works.

Specifications may be obtained on application to F. Greenhalgh, Esq., M.Inst.Gas E., Engineer and General Manager, Gas Offices, Greaves Street, Oldham.

No Tender will be received except in a plain sealed envelope, endorsed "Tender for Painting," not bearing any names or marks indicating the senders, and addressed to the Chairman of the Gas-Works Committee, Gas Offices, Greaves Street, Oldham, and received not later than 10 a.m. on Monday, May 14, 1945.

The Corporation do not bind themselves to accept the lowest or any tender.

The contract will be subject to the Standing Orders of the Council with respect to contracts, which include a requirement (in certain cases) for the provision of sureties.

Town Hall, Oldham.
THOMAS ALKER, Town Clerk.
April 23, 1945.

COUNTY BOROUGH OF DEWSBURY

(GAS DEPARTMENT)

TENDERS are invited for the RESETTING of Two "Beds of Tens" Horizontal RETORTS at the Gas-Works, Savile Town.

Forms of Tender, Schedule, and General Conditions, Specification and details of requirements, obtainable from the Gas Manager, Gas-Works, Savile Town, Dewsbury.

Tenders, in plain envelope, endorsed "Retorts," to be sent to me by Saturday, May 12, 1945.

Town Hall, Dewsbury.
HOLLAND BOOTH, Town Clerk.
April 21, 1945.

COUNTY BOROUGH OF DEWSBURY

(GAS DEPARTMENT)

TENDERS are invited for Two 40,000 cu.ft. per hour GAS COMPRESSORS with steam engine drives.

Forms of Tender, Schedule and General Conditions to be obtained from the Gas Manager, Gas-Works, Savile Town, Dewsbury.

Tenders, enclosed in a plain envelope, endorsed "Gas Compressors," to be sent to me by Saturday, May 12, 1945.

Town Hall, Dewsbury.
HOLLAND BOOTH, Town Clerk.
April 24, 1945.

BIRKENHEAD CORPORATION

(GAS DEPARTMENT)

SUPPLY OF STORES

THE Corporation of Birkenhead are prepared to receive TENDERS for the SUPPLY and DELIVERY of the following STORES and MATERIALS, as required at the Gas Department for the year commencing July 1, 1945:

Form No.
1. WROUGHT IRON TUBES AND FITTINGS.
2. CAST-IRON PIPES AND SPECIALS.
3. BRASS-WORK GAS AND METER FITTINGS.
4. TOOLS, BOLTS AND NUTS, IRON AND STEEL.
5. OILS, PAINTS, &c., BRUSHES, WASTE, HAMMER SHAFTS AND SUNDRIES.
7. GAS METERS.
8. TINWARE, &c.

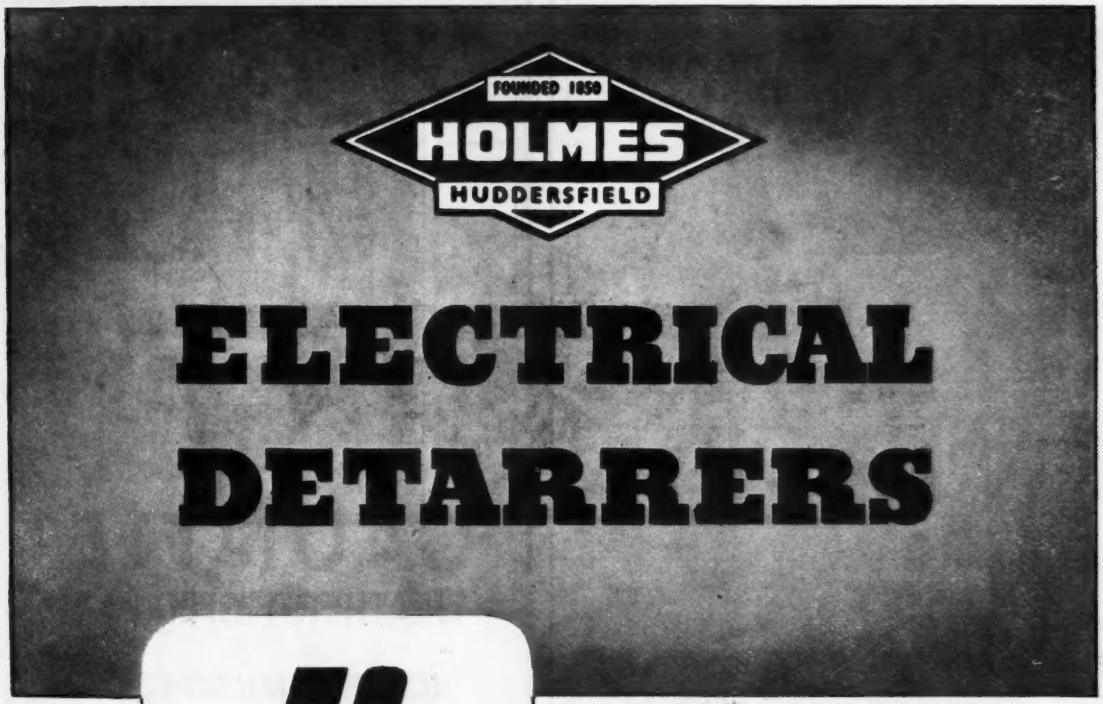
Particulars, with conditions and form of Tender, may be had, and samples inspected on application to the Gas Engineer, Gas Offices, Hind Street, Birkenhead.

Contractors are requested to read carefully the general conditions embodied in the form of Tender.

Tenders must be received by me in a plain sealed envelope, endorsed "Tender for Stores, &c., Gas Committee," not later than 5 p.m. on Friday, May 25, 1945. Tenders not properly endorsed in accordance with instructions will not be considered.

The Corporation do not bind themselves to accept the lowest or any Tender, and reserve the right of accepting the whole or any portion of a Tender.

Town Hall, Birkenhead.
E. W. TAME, Town Clerk.
April, 1945.



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Sets like a ROCK under heat

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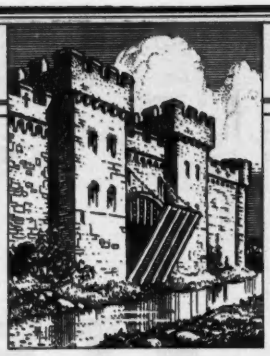

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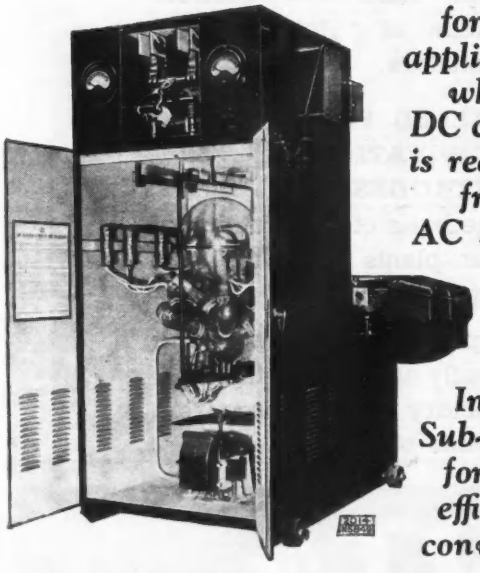

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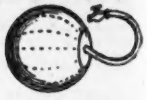

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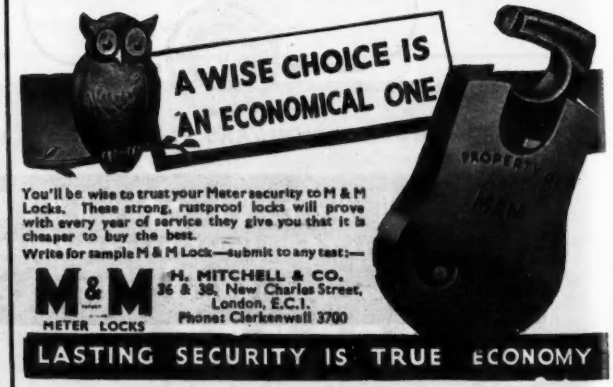

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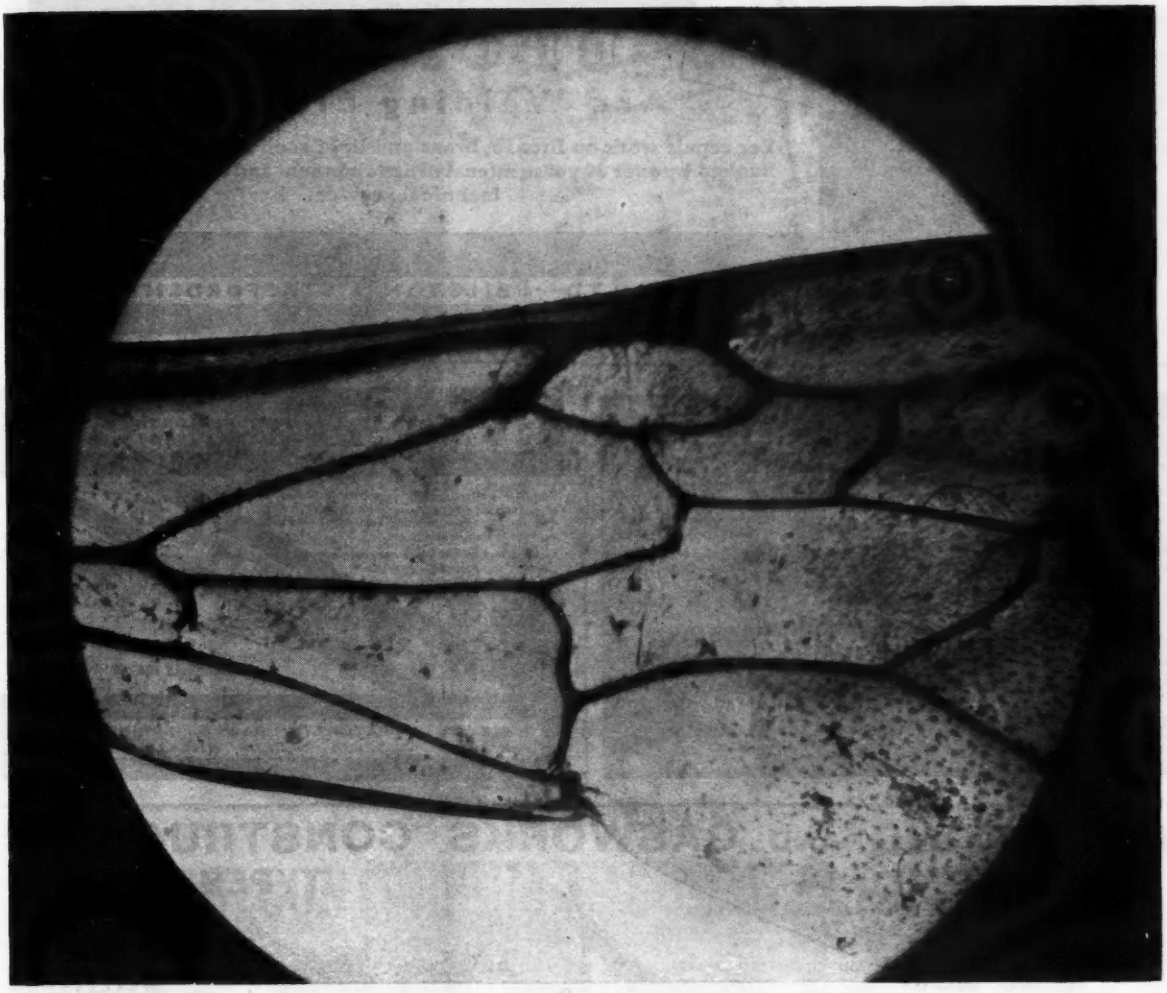

THE ADAPTABILITY OF NATURE!

An insect's wing is composed of an upper and lower membrane, the two layers being strengthened by a framework of chitinous tubes known as veins. It is capable of very rapid motion. For example, it has been found that the wing of a house-fly makes 130 strokes per second; that of a bee 190 and that of a dragon-fly 28. Paradoxical as it may seem there is an important parallel between the very rapid vibrations of an insect's wing and the very slow movements of a gas meter diaphragm. Both have to stand up to movement without wear or variation; the wing for its short lifetime with regular intervals of rest; the diaphragm for many years and often without appreciable pause. In leather diaphragms the veins of the insect's wing have their counterpart in the interlocking fibres of leather which make them tough, supple and unbreakable. These qualities are found in the highest degree when fine *Persian Sheepskins* are chosen, then scientifically processed and precision-cut—as in the making of "Multitest" Diaphragms. For consistent pliability, accuracy (and fewer Gas-Meter repairs!), specify "Multitest", available in all sizes to suit every type of meter.

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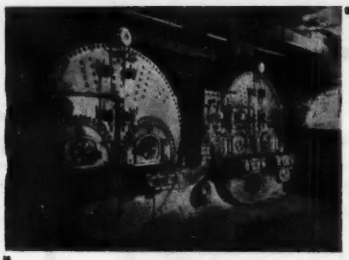

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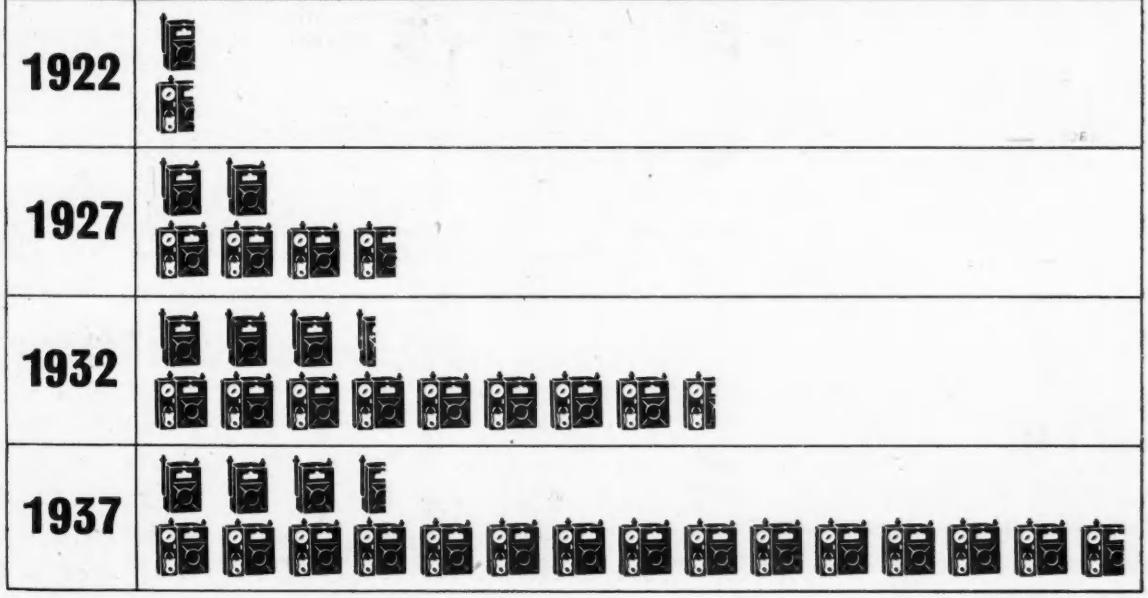
DO YOU KNOW

the percentage increase in the number of consumers since 1920?

Each symbol represents 5% increase

= ordinary = prepayment



This chart made from Board of Trade returns reminds us that the increase in the number of consumers before the war was greatest in the pre-payment category.

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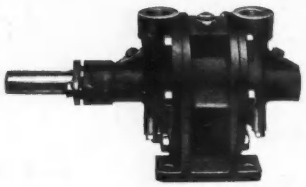

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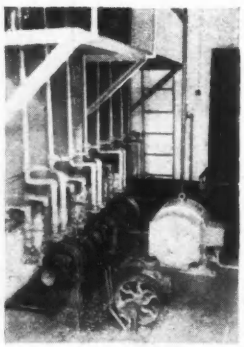

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(*b*) Tar Fog Extraction by High-Speed Sprays.

(*c*) Strength Liquor with Minimum Water or Weak Liquor Supply.

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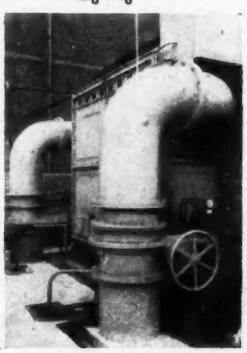

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